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RESTRUCTURING THE AIR OPERATIONS CENTER

A DEFENSE OF ORTHODOXY

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Lt Col, USAF

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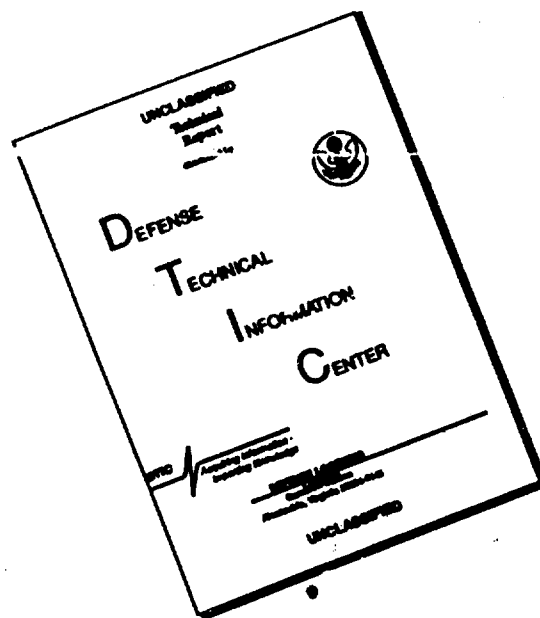
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Restructuring the Air Operations Center
A Defense of Orthodoxy

by

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To my wife, Wanda,

and daughter, Tamar

Their unfailing support in the face of my long hours and frequent absences makes all things possible.

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Foreword

The military forces of our nation should always reflect on the way they conduct business in the period following a military confrontation. When the end of the conflict coincides with significant changes in the world political scene, the military *must* revisit how it does business. In an era of lesser-perceived threats, the leaders of the US armed forces are reviewing their organizations with an eye toward eliminating those that are unnecessary. Lt Col David Tillotson tackles this issue head-on by looking at the hub of the command and control system for our theater forces—the air operations center (AOC). Some have suggested that the AOC's time is past, that it needs to be replaced, and that its utility in lesser contingencies is likely to be limited.

Colonel Tillotson discusses the functions the air commander must perform in a contingency, describes the organization intended to support the commander, and assesses the organization's performance during two recent events. His conclusions may disappoint the more reform-minded, but will reinforce the lessons of our air power history. Colonel Tillotson suggests the theater air control system can certainly be streamlined, but the major required change is that the system needs to be exercised, regularly and realistically, by the senior commanders who will depend on it in a crisis. Despite the pressures of declining budgets, the Air Force must continue to give time and attention to the means for controlling its forces if it is to maintain its leadership role in air power employment.

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About the Author

Lt Col David Tillotson III

Lt Col David Tillotson III graduated from the US Air Force Academy in 1975 with a bachelor's degree in political science. Following commissioning, he attended the University of Pittsburgh and completed a master of arts degree in international affairs. After completing basic weapons controller training at Tyndall Air Force Base (AFB), Florida, Colonel Tillotson served in tactical control squadrons at Shaw AFB, South Carolina, and Bremerhaven, Germany. In 1980, he was assigned to the Combat Concepts Division at Headquarters United States Air Forces in Europe and in 1983 moved to the Air Base Survivability Division at the Air Staff in Washington, D.C. After attending Air Command and Staff College in 1986, Colonel Tillotson commanded the 667th Aircraft Control and Warning Squadron at Hofn, Iceland. In 1988, he assumed command of the 729th Tactical Control Squadron at Hill AFB, Utah. After he completed three years as commander, the Tactical Air Command (TAC) selected him to be a command-sponsored research fellow and to attend Air War College. Colonel Tillotson is currently assigned to the staff of the North American Air Defense Command. He is married to the former Wanda Kay Morrison of Clinton, North Carolina. They have a daughter, Tamar.

Acknowledgments

Introduction

A comment from the commander of Tactical Air Command (TAC) that the air operations center (AOC) did not work and that it needed to be fixed stimulated this research project. Having long been associated with the theater air control system (TACS), I have been aware of concerns about the AOC and other elements of the system. Periodically, the Air Force has tried to implement improvements, particularly in hardware, but these efforts sometimes fell short. Some of the expressed concerns included statements that the air tasking order (ATO) was not an effective means of controlling the force, that centralized control will break down and leave us unable to perform our task, and that the system is too physically cumbersome and airlift intensive to be useful. Certainly, there is some truth in these comments.

On the other hand, I was aware from personal experience that there was a need for an effective and efficient system to control air forces. Further, I had reservations that some of the critics lacked familiarity with the system, and as a consequence, either had no confidence in it or fai'ed to recognize the need for improvements.

The changing world order and the Air Force commitment to the vision of global reach—global power present us with the continuing possibility of supporting contingencies in theaters that have no command and control structure. This possibility, combined with the limitations imposed by declining budgets and manpower, makes it important to determine if the system is broken, and if so, how to fix it. If we do not need the system, we should get rid of it. If the job can be done more efficiently, we must address the appropriate changes.

To do justice to these issues, I must try to be neutral. The question that must be asked is whether the present functions and organization of the AOC are adequate to support planning and execution of air campaigns and operations. My approach to providing an unbiased answer is to first define the functions the Air Force component commander (AFCC) must perform, either operating as the AFCC or the joint force air component commander (JFACC). Next, I present the organization and functions as they are described in appropriate Air Force regulations and guides. This description addresses my concern that some are not familiar with how the system is supposed to operate. Next, I look at how the system actually performed in recent contingencies. Using this assessment, I then present conclusions and recommendations.

In this approach I focus on functions and organization. I address communications in terms of capabilities required, but do not address communications in detail. Since the TAC communication staff is already engaged in an extensive effort to address theater communications as a result of Operations Desert Shield and Desert Storm, my effort would be redundant. Similarly, I address intelligence support requirements only in general terms, in part due to the subject's classification and in part because another researcher at the Air University Center for Aerospace Doctrine,

Research, and Education (AUCADRE) is working a project on theater intelligence requirements. I refer readers interested in the latter area to Maj James P. Marshall's study, "Near-Real-Time Intelligence on the Tactical Battlefield: The Requirement for a Combat Information System" (to be published).

Finally, discussions of the air control system are invariably an exercise in the learning and use of acronyms. These cannot be avoided, and the problem for this project is that the Air Force is in the midst of a change to its terminology. The descriptor *tactical* has been dropped from all units. For example, the tactical intelligence squadron (TIS) is now the air intelligence squadron (AIS); the TACS itself is now the theater (vice tactical) air control system. When it comes to the AOC, the problem is even worse. The new draft of Air Force Manual 2-1, "Theater Aerospace Warfare," refers to the AOC as the theater air control center (TACC). Tactical Air Command, in its reorganization of the air control wings, refers to the organization as the air operations center. I have chosen to use TAC's terminology. I apologize for any confusion, but we "live in interesting times."

Chapter 1

Functions Required for Command
and Control of Air Power

This paper begins with a discussion of the functions required to exercise command and control of air power. These functions should dictate the structure of the organization created to exercise that command and control. A basic understanding of these functions gives the subsequent discussion of the existing command and control structure meaning and serves as a benchmark to measure performance and suggest changes.

After a disastrous battle at Kasserine in North Africa during World War II (a disaster to which the fragmented control of air power contributed), the Air Force settled on a fundamental premise regarding the command and control of air power. The premise is that to ensure the most effective employment of air power, control of forces must be centralized and exercised by an airman. The following extract from War Department Field Manual (FM) 100-20, *Command and Employment of Air Power*, written in North Africa after the battle, summarizes the lesson learned.

> THE INHERENT FLEXIBILITY OF AIR POWER, IS ITS GREATEST ASSET THIS FLEXIBILITY MAKES IT POSSIBLE TO EMPLOY THE WHOLE WEIGHT OF THE AVAILABLE AIR POWER AGAINST SELECTED AREAS IN TURN; SUCH CONCENTRATED USE OF THE AIR STRIKING FORCE IS A BATTLE-WINNING FACTOR OF THE FIRST IMPORTANCE. CONTROL OF AVAILABLE AIR POWER MUST BE CENTRALIZED AND COMMAND MUST BE EXERCISED THROUGH THE AIR FORCE COMMANDER IF THIS INHERENT FLEXIBILITY AND ABILITY TO DELIVER A DECISIVE BLOW ARE TO BE FULLY EXPLOITED [capitalization in original].[1]

This essential and enduring United States Air Force (USAF) view on command of air power continues to the present. Therefore, to discuss the functions required to exercise command and control of air power, I must focus on the functions required of the airman who exercises that control, the Air Force component commander (AFCC). The principle of centralizing control with the AFCC gives rise to a number of functional requirements which the AFCC must fulfill. These functional requirements dictate the organization and functions of the AFCC's headquarters and the air operations center (AOC).

Joint doctrine also acknowledges the value of centralized control of air power and institutionalizes it in the concept of the joint force air component commander (JFACC). Should the AFCC be required to perform as the JFACC, the command and control element also must be capable of exercising functions required of that position. Although I approach the discussion of

functional requirements in terms of the service commander and the functional component commander, the resulting lists of requirements are nearly identical.

Functions of the Air Force Component Commander

Despite the increased attention given to joint operations, the role of the Air Force component commander remains important for several reasons. First, a single service may conduct operations. To ensure successful conduct of the tasked operation, the AFCC must be able to execute all functions required to employ and support the assigned force. Second, as established in Joint Publication (Pub) 0-2, *Unified Action Armed Forces (UNAAF)*, when assigned to a joint force (regardless of the joint command arrangements selected), the AFCC will "continue to have responsibility for the logistics and administrative support of Service forces assigned or attached."[2] Third, the commander in chief (CINC) of a joint force has options in organizing the force. For example, the CINC can organize the joint force along service component lines. Thus the AFCC could become one of the principal component commanders. Finally, the AFCC may be appointed as a functional component commander, such as the air component commander (ACC), with elements of several services attached.[3] This diversity of roles for the AFCC leads to a broad scope of task responsibilities. In turn, these responsibilities suggest a diversity of required functions.

Scope of Responsibilities

The responsibilities of the Air Force component commander cover the gamut of air operations and include several specialized functions. In addition to serving as the expert on employment of air power to the joint force commander (JFC), the AFCC may be tasked as the area air defense commander (AADC) and the airspace control authority (ACA). Further, the AFCC is responsible for planning, directing, and monitoring execution of the full breadth of missions carried out by air forces that may be assigned to the command. Finally, the AFCC is responsible for supporting assigned forces.

Air Force Manual (AFM) 2-1, *Tactical Air Operations—Counter Air, Close Air Support, and Air Interdiction*, states that the AFCC is "normally" the AADC, and as such, must "coordinate and integrate the entire air defense effort within the joint force command."[4] This responsibility carries with it the requirement to plan the air defenses with available assets, to task the assigned air defense units once a plan is developed, and to monitor the execution of the air defense operation both in terms of operational results and the operational readiness of assigned units. Since the AADC role involves the defense of the joint force as a whole, the tasking to carry out the AADC mission also carries with it the requirement to perform AADC functions with units from other services and, perhaps, with host-nation forces. Closely re-

lated to the responsibilities of AADC is the task of serving as the airspace control authority.

All services recognize the AFCC's responsibility to serve as the ACA. AFM 1-3, *Doctrine and Procedures for Airspace Control in the Combat Zone*, signed by all four services, states that the joint force commander will appoint the ACA, who will "normally" be the AFCC.[5] AFM 2-14, *US Air Force/US Army Airspace Management in an Area of Operations*, signed by both the USAF and Army chiefs of staff, goes further by recognizing the interdependence of air defense operations and airspace management and states that a "coordinated and integrated air defense and space control system under a single authority is essential."[6] AFM 2-14 also states that "for joint Air Force–Army operations, the Air Force Component Commander/Commander Air Force Forces will be designated the area air defense commander and the airspace control authority."[7] As with the AADC task, the tasking as the ACA carries with it the responsibility to plan the airspace control system, to transmit the plan to all services' aircraft in the area of operations, and to monitor execution of the plan and make changes as requirements change.[8] The requirement to transmit airspace control information to all users of the airspace carries with it the task of transmitting information beyond the theater of operations. Long-range bombers and intertheater airlifters are frequently based outside a deployed force's area of operations, yet must still have access to airspace control plans to carry out their missions.

Both the AADC and ACA functions carry with them explicit requirements to accommodate representatives from other services. The multiservice AFM 1-3 requires that services provide representatives to the ACA.[9] AFM 2-1 further states that to perform the AADC and ACA tasks, service component representatives are required.[10] The implication of these requirements is that the AFCC must have a facility capable of supporting these service representatives and for integrating them into the AFCC staff.

Tactical Air Command Manual (TACM) 2-1, *Tactical Air Operations*, requires the AFCC to be responsible for a wide range of missions to include *reconnaissance, surveillance and warning, counter air operations, interdiction, close air support, airlift, special operations, electronic warfare, search and rescue, and air refueling*.[11] The details of these operations are not important in this discussion; however, they generate a shared range of functional requirements which the AFCC must address. First, the AFCC must have a staff with sufficient expertise to deal with the planning details of the variety of systems suggested by the missions. Planning for the employment of these systems is not limited to USAF requirements. Attacks against ground targets (e.g., interdiction or close-air-support targets) require close coordination with other service commanders "because the timing of attacks against specific targets or target systems may be critical to the successful accomplishment of surface actions."[12] Second, once mission plans are developed, the plan must be communicated to the tasked units. Finally, mission results must be fed

back to the command and control system so that new plans can be developed or revised.

Running throughout the operational functions is the requirement for a comprehensive intelligence capability. To conduct planning, the AFCC must have a clear picture of opponents and their capabilities. The AFCC intelligence staff must have access to all sources of data on threat systems and statuses, to include cultural, economic, and political information. Once tasked units execute the missions, the AFCC also must have information on mission results as rapidly as possible to adjust plans in response to changes in orders of battle or other changes in enemy capabilities. The key is that intelligence information must be available from all possible sources to assist the AFCC in efficiently and effectively carrying out the tasks.[13]

In addition to intelligence support, the AFCC requires a variety of supporting activities to ensure the effective employment of the force. Most of these functions can be grouped into the general task of maintaining the status of friendly forces. Specifically, I refer to the maintenance of logistic and administrative information related to support of USAF systems and units.[14] As I mentioned at the outset of this section, these functions remain a part of the service component's responsibilities, and therefore belong to the AFCC regardless of the extent or limits of other duties.

Finally, the combination of all these responsibilities requires an extensive communication system capable of handling the diverse user requirements levied on it. The AFCC must be capable of exchanging operational information with subordinate USAF units, other service components, and other service subordinate elements (when attached). The system must be capable of handling all-source intelligence information from higher headquarters and from supporting in-theater sources, and of disseminating the same or derivative products to subordinate operational echelons. Finally, the system must be capable of exchanging logistical and administrative information between the AFCC and subordinate units and between the AFCC and sources of external support. This last point serves to emphasize the JCS position that all service component headquarters are part of the worldwide command system, and must have the capability to tie into that system when deployed.[15]

Summary of Functions

AFM 2-7, *Tactical Air Force Operations - Tactical Air Control System (TACS)*, summarizes the functions of the theater air control system (TACS) as follows:

> unity of effort through centralized planning and controlling the overall tactical air effort; decentralized execution of the detailed actions of tactical air missions; a system for airspace control that keeps interference among airspace users in an area of operations to a minimum; and the integration of supporting forces in the total air effort.[16]

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Although this statement accurately summarizes the AFCC's functions, it is not useful for analyzing whether or not the current AOC meets the functional requirements of the AFCC. To address this issue, I have broken the AFCC's functional requirements into the areas of planning and tasking, directing and monitoring, and communications.

Planning and Tasking. Resident in all of the AFCC's tasks is the requirement for the AFCC to first plan operations and then to task assigned units to execute the plan. Operationally, the planning function requires a staff of sufficient expertise and diversity to understand the capabilities and limitations of all systems the USAF employs. If the AFCC is performing functions (e.g., the AADC function) that require control over other service forces, staff expertise must extend to those forces' systems either through exchange of information with other service component staffs or through the assignment of other service personnel to the AFCC staff. This staff must have some access to information regarding the operational status and limitations of assigned forces to accommodate those limitations or capabilities while constructing a plan. Finally, the operational staff must have the means to translate the plan to a tasking that can be sent to assigned forces to execute.

The intelligence component of the AFCC staff must provide support to the planning staff throughout the planning process. Before the start of operations, the intelligence staff must develop a clear picture of enemy capabilities and vulnerabilities as a baseline for initial action. As operations progress, the staff must update that picture based both on enemy actions and on the results of friendly action on enemy capabilities. Intelligence staff members collect information from as many sources as possible to ensure that the information is accurate and valid. In order that the operations tempo not be interrupted, they must gather information as rapidly as possible so that the AFCC staff can develop new plans and task new operations before the enemy can react. All of this suggests a capability to collect all-source intelligence in as near real time as possible.

Directing and Monitoring. The second major functional area required of the AFCC is the ability to direct the tasked force through the execution of the missions and to monitor the results. Once the plan is dispatched to assigned forces, the AFCC staff must monitor execution and adjust activities in response to unforeseen events. These events could either be the result of enemy action or simply the result of failures among friendly forces (e.g., maintenance failure to deliver equipment, operational mishaps, etc.). The requirement to adjust taskings on a dynamic basis drives the need for a staff of personnel with broad expertise in all assigned systems and capabilities. In addition, the likelihood that the AFCC staff will be conducting operations and, at the same time, planning for future activities suggests that the planning staff and the execution staff should be separate groups.

In addition to monitoring the operational results of mission execution, the AFCC staff must monitor the logistic and operational readiness of assigned forces. Such gross data as numbers of operational aircraft, stocks of munitions, and availability of fuel will directly affect the ability of friendly forces to

execute their tasks. This data will also affect the planning staff in deciding how to task future activities.

The intelligence staff also plays a key role in the monitoring functions. First, the intelligence staff must monitor ongoing enemy activities to detect emerging threats that the operational staff might have to deal with while monitoring execution of current missions. Response to these emerging threats might require diversion of missions from scheduled targets to meet the new threats. Second, the intelligence staff must monitor the effects of mission results on enemy targets and capabilities (bomb damage assessment [BDA]) and provide these results to the planning staff so that developing plans can be adjusted in light of friendly successes or failures.

Communications. TACS functions require a communication system capable of handling the information needed to make a centralized tasking system work. Support of planning efforts first requires access to sources of intelligence and operational information necessary for formulating reasonable plans. For intelligence information, this means access to sources that may be outside the theater of operations (national sources), from sensor systems operating within the theater, and from assigned units (BDA). Information formats include voice reports, messages, imagery, and formatted data links. Operational planners require access to information on the status of assigned friendly forces, regardless of these units' locations (in or out of theater), in addition to the information provided to the intelligence community. Finally, the tasking function requires the ability to send a tasking plan and supporting intelligence information to assigned forces for execution, driving the need for assigned units to be able to receive voice and formatted communications and imagery.

The directing and monitoring functions generally require the same types of communication capabilities as the tasking function. However, the requirement for timely information is compounded if the operational staff is to respond to execution problems as they occur. Therefore, the directing and monitoring function should have access to real-time voice and data information. Connectivity must run from sensor systems to both the AFCC's headquarters and to unit-level reporting systems to ensure rapid dissemination of information. Finally, to the extent that assigned forces include those from other services, communication capabilities must include the capability to communicate with other service headquarters and units.

Functions of the
Joint Force Air Component Commander

As noted in the discussion of the AFCC's functions, the joint force commander has the option of organizing the force along functional lines rather than service lines. One of the variations of this option is to appoint a joint force air component commander who has the responsibility for planning and

coordinating the employment of all air assets of the joint force. JFACC roles include planning, coordination, allocation, and tasking of air assets based on the JFC's apportionment decision. Apportionment is simply the decision by the JFC regarding the relative weight of effort the command's air assets will devote to each of the various mission areas.[17] As might be expected given the USAF's preference for centralized control of air power, Tactical Air Command Pamphlet (TACP) 2-2, *Joint Force Air Component Commander (JFACC) Concept of Operations*, endorses the benefit to the JFC of appointing a JFACC. In particular, TACP 2-2 states that the JFACC gives the JFC the means to develop a coordinated joint air operations campaign.[18]

Regardless of the desirability of having a JFACC, if the JFC elects to appoint a JFACC, the JFACC should be appointed from the service component which has the preponderance of air assets and "*the ability to assume responsibility* |emphasis added|" for the task.[19] Draft AFM 2-1, "Theater Aerospace Warfare," expands on this last criterion and states that the JFACC must have "the Command, Control, Communications, and Intelligence infrastructure necessary to plan and conduct a theater air campaign."[20] If the USAF command element is to be prepared to assume the JFACC role, we must address the functional requirements this task might entail in the design of the AOC. As we shall see, the resulting list of functions will be very similar to those developed for the AFCC.

Scope of Responsibilities

The scope of JFACC responsibilities, like that of the AFCC, covers the range of air operations and several specialized functions. However, the JFACC does not bear the responsibility for logistic support of assigned forces. The result is that in monitoring the status of assigned forces, the JFACC is going to be much more focused on those elements of logistic status that affect operational readiness. Even then, the JFACC will be concerned primarily with availability of forces and when force shortfalls will be remedied. For example, the JFACC does not need to know that the engine on an aircraft is undergoing maintenance; instead the JFACC is more interested in the fact that the aircraft is not operational and when it will be returned to operation.

If the JFC appoints a JFACC, the JFACC is responsible for the performance of such specialized functions as the AADC and ACA roles. In these roles, the JFACC executes specific responsibilities for exercising control over assigned air defense forces, publishes tasking directives, monitors the status and execution of air defenses, and prepares and disseminates airspace control information.[21] In addition to being responsible for developing a coordinated air campaign, the JFACC develops plans for air asset employment in all mission areas (e.g., counter air, interdiction, close air support, reconnaissance and surveillance, electronic warfare, air refueling, airlift, and special operations). In all of this, close coordination with all service components is required, and the presence of representatives from all services is essential.[22] In

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short, the scope of JFACC responsibilities is similar to that developed for the AFCC.

As in the operational area, the scope of intelligence responsibilities for the JFACC parallels that of the AFCC. Joint publications make some of the intelligence requirements more explicit. The JFACC intelligence system must be capable of obtaining a cross flow of information from other services and even allied sources.[23] Further, joint doctrine calls for the intelligence community to provide "near-real-time target data" for attacking forces. Such a requirement, the publication recognizes, drives a requirement for good automatic data processing (ADP) support in the intelligence area.[24] The Army's Training and Doctrine Command (TRADOC) Pamphlet (Pam) 525-5, *AirLand Operations*, cosigned by the commander, Tactical Air Command (TAC), emphasizes the need for timely BDA to support attacks against enemy forces.[25] In summary, timely and accurate intelligence support is as essential for the JFACC as it is for the AFCC, and joint documentation reinforces and expands the description of the capabilities required.

Joint publications also describe the requirement for the JFACC to coordinate with some specialized joint agencies in performing duties. The JFC's joint operations center (JOC) is tasked with several functions which affect or involve air operations. These functions include the joint rescue coordination center (JRCC); the joint movement center, which handles movement (including airlift) of cargo and personnel; and the joint special operations command, which is responsible for employment of special operations forces.[26] However, TACP 2-2 suggests that the JOC would not be suitable for the JFACC since it lacks access to real-time control and coordination assets.[27] Therefore, the JFACC's command center may be located apart from the JOC, but must coordinate closely with the JOC to carry out assigned functions

Finally, as was the case for the AFCC, all JFACC responsibilities carry with them the requirement for a diverse communication system with multiservice elements capable of voice, data, and imagery transmission. Connectivity requirements include links with assigned forces (at least their service component headquarters), the JOC (if separately located), and agencies outside the theater (especially intelligence sources). The requirements for ADP support suggest the need to handle secure data communications to ensure timely support, especially for intelligence functions.[28]

Summary of Functions

As I suggested at the beginning of the discussion of the JFACC's scope of responsibilities, the functions required of the JFACC are not substantially different from those required of the AFCC, especially in light of the scope of potential responsibilities the USAF and the other services assign the AFCC. Therefore, I now address the same three areas: planning and tasking, directing and monitoring, and communications.

Planning and Tasking. The functional requirement in this area is identical to that established for the AFCC. The emphasis on the need for joint participation in the planning and tasking process is at the heart of this function. All services that have forces assigned to the joint force must have representation at the JFACC's command center.

Directing and Monitoring. The functional requirement here is nearly identical to that established for the AFCC. The JFACC needs the capability to direct and monitor the force and the enemy in real time. The significant difference is in the need for readiness and logistical data on friendly forces. The focus for the JFACC is on how logistical status affects operational posture and on when improvements in readiness can be expected. For example, the JFACC needs to know that 20 of 24 F-15s at a given base are operational and that the base expects all to be operational in six hours. The JFACC does not need to know that the aircraft are down for engine problems. The Air Force component commander, on the other hand, would need the amplifying information on the logistic problem since, as the service component commander, the AFCC is also responsible for repair and for provision of parts and supplies.

Communications. The JFACC's need for communications is nearly identical to that of the AFCC, with emphasis on communications with all service components. Although the JFACC has functional responsibility for communication, there are no assets provided by the joint headquarters. In fact, Joint Pub 0-2 states that component tactical communications will remain responsive to the component commander, although they can be added to the joint network.[29] This issue, combined with the issue of the facilities and ADP support required to execute the JFACC command function, cuts to the heart of the criteria for establishing which service component will be responsible for the JFACC function. As previously noted, selection is based equally on contribution of forces and "capability" to assume the duties required.

Summary

As I have shown, both the AFCC and the JFACC share nearly identical functional requirements. To employ air power effectively (even if it is exclusively USAF forces), the AFCC must have the means to plan and task the force; the capabilities to direct and monitor execution of the tasking; and the ability to communicate with assigned forces, higher headquarters, and with other service elements if they are deployed in the area of operations. The final requirement, having the capability to communicate and coordinate with other service components, exists regardless of the AFCC's role in the joint force structure. This requirement exists because some AFCC missions are flown especially for the support of other service components (e.g., close air support), while others may be flown in support of either USAF or other service elements (e.g., airlift and air refueling). This standing requirement for

continuous coordination with all components of the joint force makes the AFCC an attractive candidate for the JFACC role.

The JFACC's functions differ from the AFCC's only in degree. The JFACC's emphasis is clearly on the interface among all components of the joint force, and the JFACC has less need for detailed logistical support data. However, the functional areas of planning and tasking, directing and monitoring, and communications are essentially the same for either position. Based on this overlap, I will combine the functional requirements of the AFCC and the JFACC in evaluating the structure of the current AOC.

Both the joint community and the USAF share a belief in value of centralized direction of military forces. Joint Pub 0-2 states that adhering to the principles of "centralized direction" and "decentralized execution" allows the commander to coordinate the operation of assigned forces, while still allowing those forces the freedom to operate.[30] The USAF states the need more directly in AFM 2-7 urging that the principle of "unity of effort" demands a central planning level with full cognizance of air, land, and naval operations.[31] The key question is whether the AOC provides the vehicle for this centralized direction without imposing unnecessary limitations on the deployed force. In the next two chapters, we will examine how the AOC is currently structured and whether that structure allows it to perform its functions. Then we will explore the AOC's performance during recent conflicts.

Notes

1. War Department FM 100-20, *Command and Employment of Air Power*, 21 July 1943, 1-1.

2. Joint Pub 0-2, *Unified Action Armed Forces (UNAAF)*, 1 December 1986, 3-11.

3. Ibid., 3-13.

4. AFM 2-1, *Tactical Air Operations—Counter Air, Close Air Support, and Air Interdiction*, 2 May 1969, 5-2.

5. AFM 1-3, *Doctrine and Procedures for Airspace Control in the Combat Zone*, 1 December 1975, 2-1. See also AFM 2-1, 5-2, for additional information.

6. AFM 2-14, *US Air Force/US Army Airspace Management in an Area of Operations*, 1 November 1976, 1-1.

7. Ibid.

8. AFM 2-12, *Airspace Control in the Combat Zone*, 22 August 1988, 5. See also AFM 1-3, 1-3 and 2-1 through 2-2; and AFM 2-11, 2-1 and chapter 4 for additional information.

9. AFM 1-3, 2-1.

10. AFM 2-1, 5-2.

11. TACM 2-1, *Tactical Air Operations*, 15 April 1978, chapters 4 and 5.

12. AFM 2-1, 7-1.

13. Ibid., 8-1 through 8-4.

14. AFM 2-7, *Tactical Air Force Operations—Tactical Air Control System (TACS)*, 2 February 1979, 2-4 through 2-5. See also AFM 2-1, 9-1, TACM 2-1, 3-6, and Joint Pub 0-2, 3-57 through 3-63 for additional information.

15. Joint Pub 0-2, 3-33.

16. AFM 2-7, 2-1.

17. Joint Pub 3-03.1, *Doctrine for Joint Interdiction of Follow-on Forces [Follow-on Force Attack (FOFA)]* (Test Pub), 16 June 1988, vii.

18. TACP 2-2, *Joint Force Air Component Commander (JFACC) Concept of Operations*, 28 August 1991, 3.

19. Joint Pub 3-03, I, III-3. See also TACP 2-2, 1-5 for additional information.

20. AFM 2-1, *Theater Aerospace Warfare (Coorddraft)*, 23 March 1992, 8.

21. Joint Pub 3-03, I, III-1 through III-7. See also AFM 2-1, 3 for additional information.

22. TACP 50-29, *General Operating Procedures for Joint Attack of the Second Echelon (J-SAK)*, 31 December 1984, 2-8 through 2-12, 4-2. See also Joint Pub 3-03, I, III-3 for additional information.

23. TRADOC Pam 525-5, *Airland Operations: A Concept for the Evolution of Airland Battle for the Strategic Army of the 1990s and Beyond*, 1 August 1991, 18-19. See also Joint Pub 0-2, 3-17 through 3-18 for additional information.

24. Joint Pub 3-03, I, II-1, II-6, IV-2 through IV-5.

25. TRADOC Pam 525-5, 21.

26. Joint Pub 5-00.1, *Joint Task Force (JTF) Planning Guidance and Procedures*, Test Pub, 15 June 1988, D-A-1 through D-A-4. See also AFM 2-50, *USA/USAF Doctrine for Joint Airborne and Tactical Airlift Operations*, January 1987, 9-11, and TACP 2-2, 10-12 for additional information.

27. TACP 2-2, 9.

28. Joint Pub 3-03, I, III-6.

29. Joint Pub 0-2, 3-62.

30. Ibid., 3-3.

31. AFM 2-7, 2-1.

Chapter 2

Organization of the Air Operations Center

Having discussed the functions required of the Air Force component commander and the joint force air component commander in the previous chapter, we now turn to a description of the air operations center; the organization through which the AFCC (or JFACC) exercises the functions of planning and tasking, directing and monitoring, and communication. First, however, this chapter discusses who is responsible for the AFCC function in contingencies. (For the purposes of this paper, contingencies are defined as operations up to and including major regional contingencies.) Next, the chapter describes the organization that supports the AFCC, and finally presents the substructure of the AFCC's command facility.

Air Force Component Commander

In the tactical air forces, commanders of the numbered air forces (NAF) serve as Air Force component commanders in contingencies.[1] Assuming the AFCC possesses the preponderance of air assets and the means to control air operations, the NAF commander could also serve as the JFACC if so designated by the JFC. For this paper, the commanders of the numbered air forces with whom we are concerned (and who operate AOC) are the commanders of the Ninth and Twelfth Air Forces. Tactical Air Command Regulation (TACR) 23-2, *Tactical Air Command Numbered Air Forces*, specifies that the NAF is the level for Air Force coordination with the supported CINC's.[2] NAF commanders are further assigned regional responsibilities so their staffs can coordinate and plan with the appropriate supported CINC. The Ninth Air Force commander acts as the US Air Forces, Central Command (CENTAF) commander. The Twelfth Air Force commander acts as the US Air Forces, Southern Command (SOUTHAF) commander. The Twelfth Air Force commander also serves as the commander of Air Force Forces (COMAFFOR) Caribbean under the US Atlantic Command.[3]

The general organization of the NAF staff is shown at figure 1, and two points should be made about this organization. One, there is a diversity of functions ranging from the operational to general support. The NAF staff is not solely an operational organization. A large part of its daily functions, even in the operations staff, is devoted to such things as personnel issues, budget and finance, and acquisition and development of new equipment

Figure 1. TAC Numbered Air Force Organization
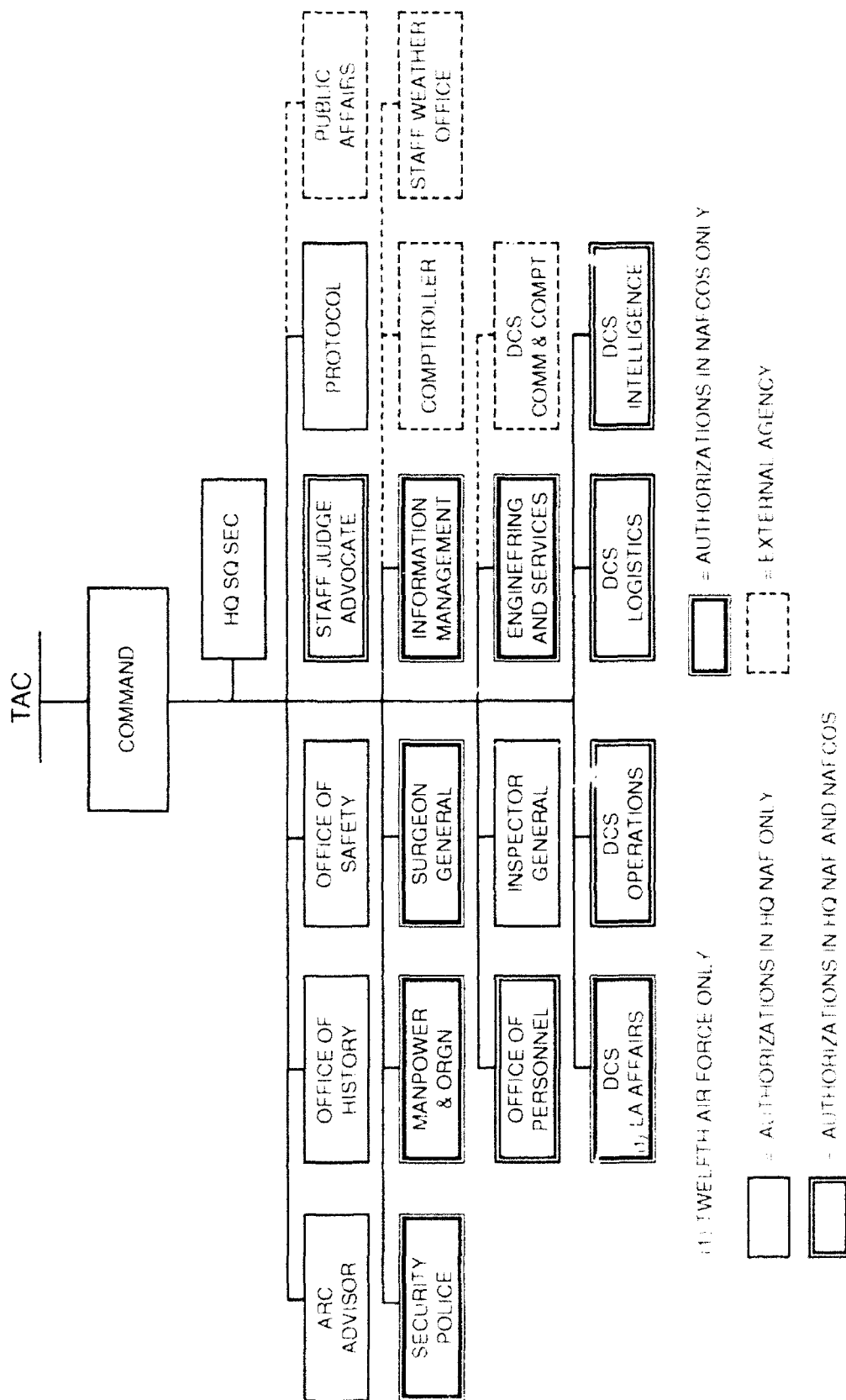
Source: Adapted from TACR 23-2, Tactical Air Command Numbered Air Forces, 6 December 1990.

■ = AUTHORIZATIONS IN HQ NAF ONLY

▢ = AUTHORIZATIONS IN HQ NAF AND NAF COS

(1) TWELFTH AIR FORCE ONLY

□ = AUTHORIZATIONS IN NAF COS ONLY

⌐ ⌐ = EXTERNAL AGENCY

While these functions are not necessarily inappropriate, they are redundant to similar functions performed at the subordinate unit level, the major command, or both.

The second point, related to the first, is that the staff is separated into the NAF staff and the NAF combat operations staff (NAFCOS). The NAF staff's primary focus is on the force management or peacetime functions. The NAFCOS, on the other hand, exists to provide the combat staff for the supported CINC.[4] Note that the separation is blurred in practice. Thus in peacetime the NAF staff also tends to focus on the force management functions of the headquarters, not on the combat operations functions.

In a contingency or wartime situation, elements of the NAF staff and the NAFCOS form what is known as either the Tactical Air Force headquarters (TAF HQ) or the Air Force component headquarters (AFCH). These personnel become the command and staff element for the AFCC. As the component commander, the AFCC carries out responsibilities through the theater air control system. The TACS provides the AFCC the means to exercise command and control over USAF forces. Evolved throughout the Air Force's history, the TACS consists of radar elements (ground-based and airborne) that allow the AFCC to exercise command and direction over air traffic and the airspace within the area of responsibility (AOR); a system to coordinate the support to land forces within the AOR; and a system to control airlift forces within the AOR.[5] In addition, "TACS provides the AFCC with the elements necessary for coordination at appropriate levels with forces of other commands or Services operating within or through the area of operations."[6] The senior element of the TACS is the air operations center.

Air Operations Center

The AOC provides the "means of execution" for the Air Force component commander. The role of the AOC is to "provide the information and the facilities to support the component level function."[7] Basically, the AOC is the operations center for the AFCH. In addition, if the AFCC is also the JFACC, the AOC serves as the hub of operations for all air operations within the area of responsibility. This function is required because the joint force headquarters is manned in peacetime to perform peacetime functions; in wartime, the joint headquarters must be augmented to perform its full range of wartime functions.[8] When augmented by representatives from other services, the AOC can provide a readily available facility and support staff to perform JFACC functions. Figure 2 shows the relationships among the various elements in the organization of the joint force structure. (The battlefield coordination element [BCE] and naval and amphibious liaison element [NALE] will be discussed later.)
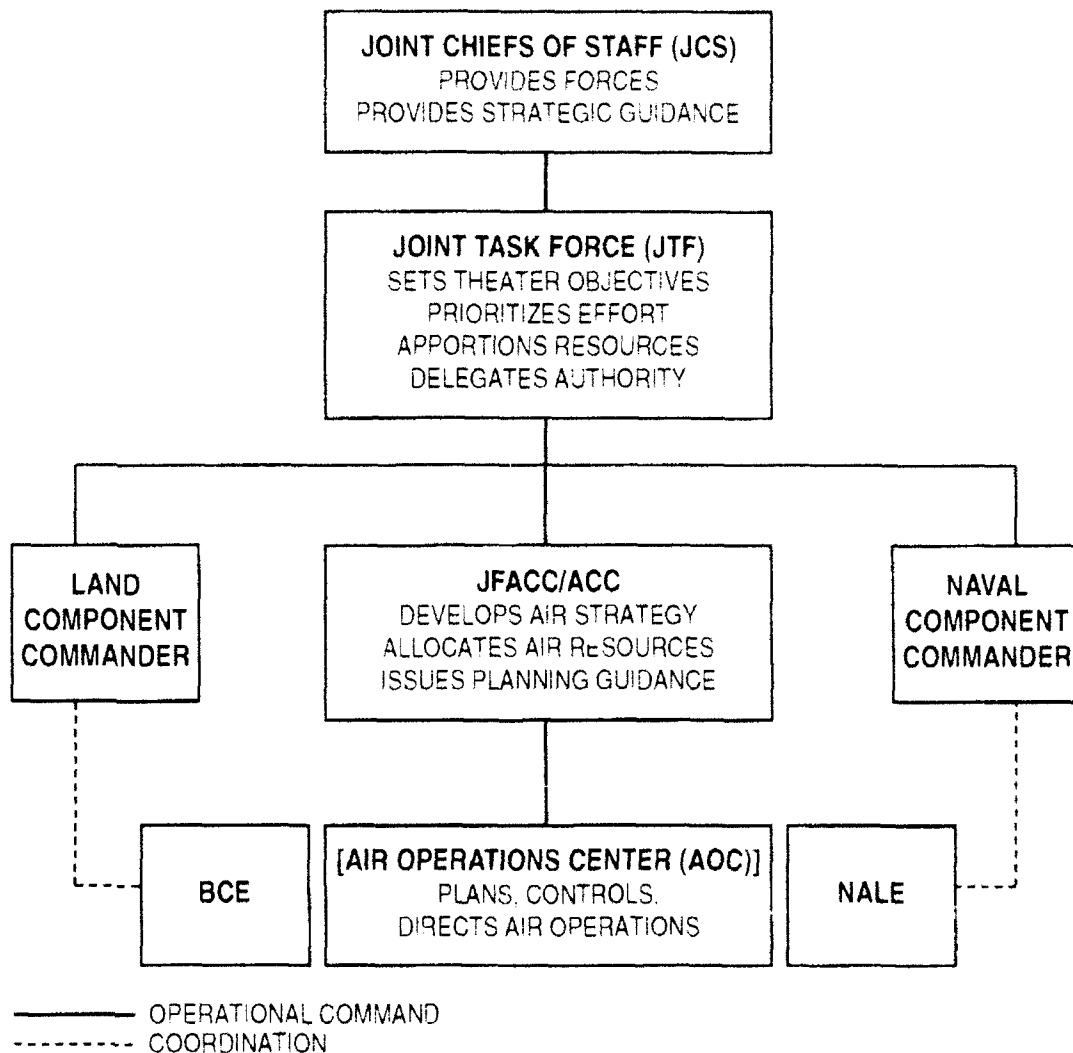
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            ┌─────────────────────────────────┐
            │   JOINT CHIEFS OF STAFF (JCS)    │
            │        PROVIDES FORCES           │
            │   PROVIDES STRATEGIC GUIDANCE    │
            └─────────────────────────────────┘
                            │
            ┌─────────────────────────────────┐
            │     JOINT TASK FORCE (JTF)       │
            │     SETS THEATER OBJECTIVES      │
            │       PRIORITIZES EFFORT         │
            │     APPORTIONS RESOURCES         │
            │      DELEGATES AUTHORITY         │
            └─────────────────────────────────┘
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LAND COMPONENT COMMANDER	JFACC/ACC DEVELOPS AIR STRATEGY ALLOCATES AIR RESOURCES ISSUES PLANNING GUIDANCE	NAVAL COMPONENT COMMANDER
BCE	[AIR OPERATIONS CENTER (AOC)] PLANS, CONTROLS, DIRECTS AIR OPERATIONS	NALE

———— OPERATIONAL COMMAND
-------- COORDINATION

Source: TACR 55-45. *Tactical Air Force Headquarters and the Tactical Air Control Center* 8 April 1988

Figure 2. Joint Force Structure Organization

Role of the Air Operations Center

A detailed reading of several current USAF publications covering the functions of the AOC reveals some confusion about the extent of the role the AOC is to fulfill for the AFCC. AFM 2-12, *Airspace Control in the Combat Zone*, suggests that "[AOC] functions include centralized *planning*, direction, control, and coordination of air operations for the JFACC within the designated area of operations [emphasis added]."[9] This version of the functional description suggests that the AOC will do everything from developing the air campaign to monitoring mission execution. Other guidance suggests that the

AOC serves a more restricted role. AFM 2-1, *Tactical Air Operations—Counter Air, Close Air Support, and Air Interdiction*, tends to stress the current operations functions of the AOC, rather than planning functions.[10] AFM 2-7, *Tactical Air Operations—Tactical Air Control System (TACS)*, reinforces this lesser role in planning (in the sense of a general concept of air operations). The manual states that the AOC plans and monitors current operations based on an air operations plan the AFCH director of plans provides. The director of the AOC is then responsible for controlling and monitoring Air Force operational activities within the theater, but the job of air campaign planning resides with the Air Force component headquarters.[11] Perhaps the clearest definition of functions comes not from directives, but from the concept of operations for the modular AOC. The concept of operations states that the AOC's primary function is force employment—to translate the operational guidance of the AFCC to an air tasking order.[12] This description again reinforces the notion that the air operations center takes over once the AFCH staff develops the general concept for the air campaign.

The organizational arrangements which include the AOC endorse the more restricted version of the AOC's role in support of the AFCC. Figure 3 shows the organizational relationship between the AFCH (the TAF HQ) and the AOC. According to TACM 2-1, *Tactical Air Operations*, the AOC is a different organizational level than the AFCH, and its focus is on execution and monitoring of current operations.[13] The AOC works for the director of operations (DO) at the TAF HQ.[14] AFM 2-7 also suggests that the AOC may even be separated from the AFCH, in my experience, the two have always been collocated.[15]
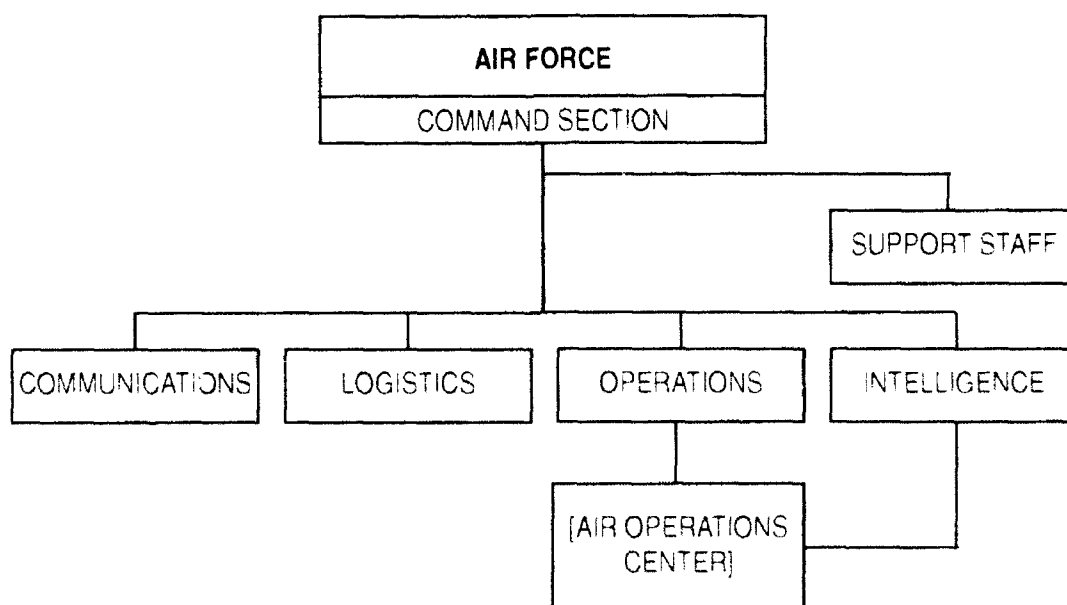
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                  ┌─────────────────────────┐
                  │       AIR FORCE          │
                  ├─────────────────────────┤
                  │    COMMAND SECTION        │
                  └─────────────────────────┘
                                │
                                │           ┌─────────────────┐
                                │           │ SUPPORT STAFF   │
                                │           └─────────────────┘
    ┌───────────────┬───────────────┬───────────────┬───────────────┐
┌──────────────┐ ┌──────────┐ ┌──────────────┐ ┌──────────────┐
│COMMUNICATIONS│ │ LOGISTICS│ │  OPERATIONS  │ │ INTELLIGENCE │
└──────────────┘ └──────────┘ └──────────────┘ └──────────────┘
                                      │
                              ┌──────────────┐
                              │[AIR OPERATIONS│
                              │   CENTER]     │
                              └──────────────┘
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Source: TACR 55-45. *Tactical Air Force Headquarters and the Tactical Air Control Center*, 8 April 1988.

Figure 3. Air Force Component Headquarters

Peacetime Organization

In peacetime, the AOC does not exist. The functions that combine to become a wartime or contingency AOC are divided among a number of organizations. USAF Chief of Staff Gen Merrill A. McPeak's article on the composite wing observed that the convened AOC is a large organization the Force cannot afford (in manpower terms) in peacetime.[16] The result is that a number of skeleton peacetime organizations are maintained that must be augmented to perform their full range of functions. For administrative purposes these units, along with other elements of the TACS, are grouped under an air control wing (ACW).

The two units that form the basis of the AOC are the air control center squadron and the air intelligence squadron (AIS). The AOC's mission is to maintain and provide an operationally ready AOC for the Air Force component commander.[17] The air control center squadron in peacetime consists largely of maintenance and communications personnel who maintain the facility, supporting communications equipment, and vehicles for the fully operational AOC. The squadron also has a cadre of operations specialists (pilots, navigators, and command and control specialists) who provide baseline expertise in planning and executing air operations. For the AOC to be fully functional, this cadre must be augmented by similar specialists from numbered air force and air control wing staffs.

The second key organization is the AIS. The mission of the AIS is to provide intelligence support to the AFCC both "in-garrison or deployed." Like the air control center squadron, the AIS works for the ACW.[18] It consists of intelligence specialists and supporting communications-electronics specialists and maintenance personnel to maintain and operate its assigned electronic, communication, and vehicle support. In wartime, the AIS integrates with the air control center squadron and NAF staffs to form fully operational organizations.

The wartime or contingency AOC thus does not exist on a day-to-day basis. Instead, a contingency or wartime AOC consists of the air control center squadron plus the AIS with augmentees from NAF and ACW staffs.[19] This relationship is shown in figure 4. Of interest, the ACW has no wartime or contingency role; its staff is divided among the various operational elements of the TACS or augments the Air Force component headquarters. Further, the air control center squadron and AIS commanders are coequal, reporting to the ACW commander in peacetime and combining into a wholly different functional arrangement in contingencies or wartime.

Functional Organization

The degree the peacetime organization aids or inhibits functioning of the fully operational AOC is not clear until we review the way the AOC is actually organized to accomplish its mission. This functional organization is at considerable variance from the peacetime organization. Moreover, since the organizations that comprise the operational AOC are manned only at cadre
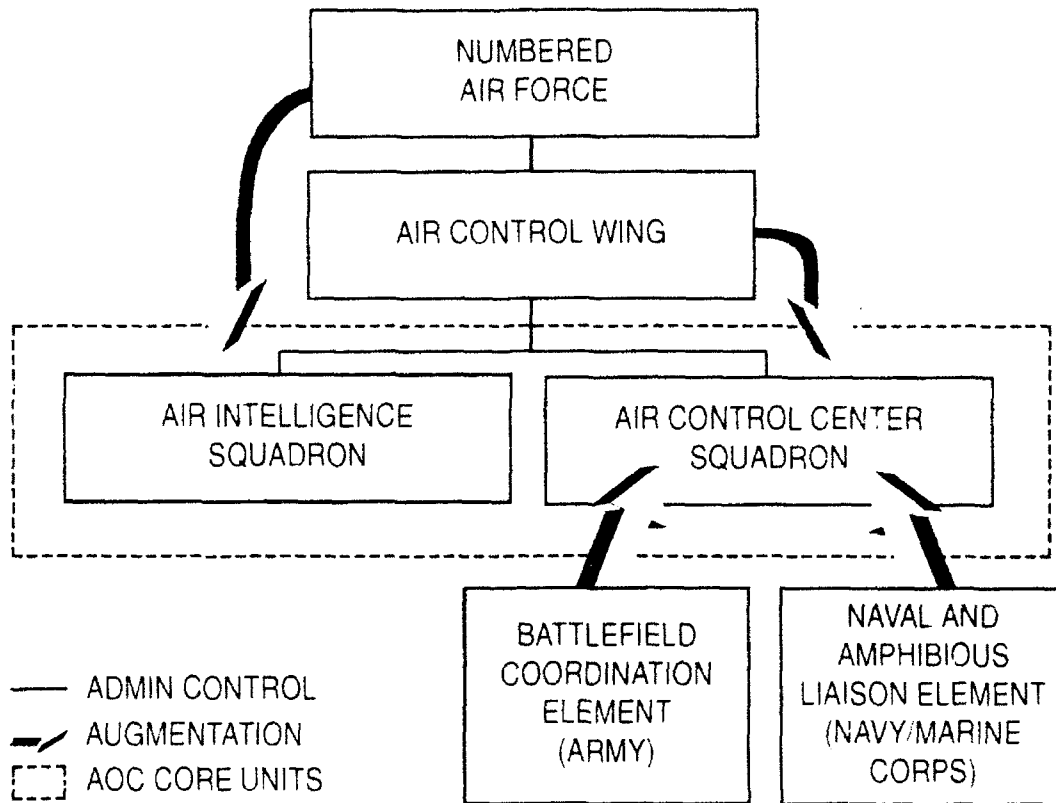
Figure 4. Peacetime to Wartime Conversion (Formation of the AOC)

levels in peacetime, the organization must not only transition to a new structure but also must incorporate a variety of new players as it commences operations.

Figure 5 shows the functional organization of the operational AOC. The four-way grid shows how the various elements of the air control center squadron and the AIS combine to form the basic AOC. Within the air control center squadron, the operations section is divided into combat plans and combat operations divisions. These divisions form the hub of the AOC's planning and tasking, and directing and monitoring functions. Similarly, the AIS divides into two agencies, an enemy situation correlation division and a combat intelligence division, which support the combat plans and combat operations divisions respectively.[20]

The combat plans and combat intelligence divisions perform the planning and tasking functions of the AOC. As the diagram in figure 5 suggests, these divisions concern themselves with "tomorrow's war." These divisions combine the developing intelligence picture and planning guidance from the AFCC to develop the detailed plan of operations. This plan is then transmitted to assigned units in the form of the air tasking order (ATO).
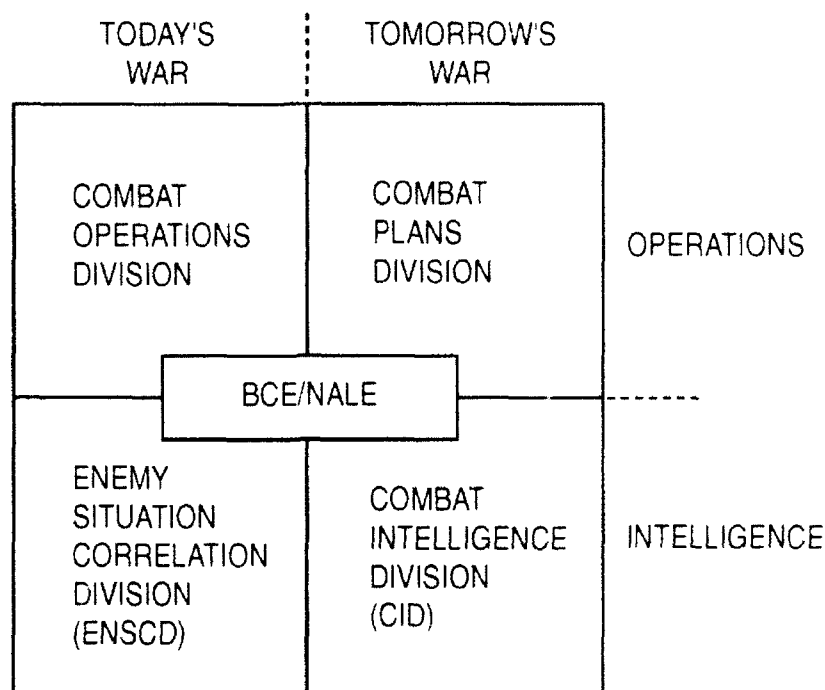
19

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        TODAY'S      ┊    TOMORROW'S
         WAR         ┊       WAR

  ┌─────────────────┬─────────────────┐
  │                 │                 │
  │  COMBAT         │  COMBAT         │
  │  OPERATIONS     │  PLANS          │  OPERATIONS
  │  DIVISION       │  DIVISION       │
  │          ┌──────┴──────┐          │
  ├──────────┤  BCE/NALE   ├──────────┤  - - - - - -
  │          └──────┬──────┘          │
  │  ENEMY          │                 │
  │  SITUATION      │  COMBAT         │
  │  CORRELATION    │  INTELLIGENCE   │  INTELLIGENCE
  │  DIVISION       │  DIVISION       │
  │  (ENSCD)        │  (CID)          │
  │                 │                 │
  └─────────────────┴─────────────────┘
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Source: TACR 55-45. *Tactical Air Force Headquarters and the Tactical Air Control Center.* 8 April 1988

Figure 5. Air Operations Center Divisions

Once the ATO is transmitted to the tasked units, the combat operations and enemy situation correlation divisions assume responsibility for the directing and monitoring functions. The combat operations division is responsible for monitoring execution of the plan and making changes in response to AFCC guidance, the status of friendly units, and enemy activities. The enemy situation correlation division monitors the results of missions to update threat situation displays and provides advice to the combat operations division regarding enemy activities affecting missions in progress.

Among the AOC functions specified in AFM 2-7 is the requirement to include representatives from other services.[21] The box in figure 5 marked "BCE/NALE" identifies the other service representation in the AOC. The battlefield coordination element is the land component commander's (LCC) representative to the AFCC. This element provides both the LCC's requirements for planning and assists in monitoring the execution of missions as they affect, or are affected by, the ground commander's actions.[22] The naval and amphibious liaison element provides the same functions for the Navy and amphibious force commanders.[23] The diagram shows the BCE/NALE functions extending into both the planning and tasking, and the directing and monitoring functions because these elements have responsibilities in both functional areas. Since none of the USAF elements that constitute the AOC has other service personnel assigned in peacetime, these functions must be

20

filled by the concerned service (i.e., Army, Navy, or Marine Corps depending on the forces deployed) once an operational AOC is established. The Army has institutionalized its BCE, and integration arrangements between the USAF AOC and Army BCE are specified in both USAF and Army publications. Figure 6 shows the integration of the BCE into the AOC.

In addition to the principal service liaisons, a number of other organizations including the services, other USAF major commands, and joint agencies, provide liaisons to the AOC in actual operations. These include special operations forces; Strategic Air Command (SAC), for tankers and bombers; Military Airlift Command (MAC), for control of airlift forces; rescue specialists, to form a joint rescue coordination center; and service representatives to the airspace control center and the air defense operations center.

Within the AOC's major functional divisions are a number of subordinate sections that are divided into areas of operational expertise (in combat plans and combat operations divisions) or into subordinate functional sections (in the intelligence divisions). These subsections are shown in detail in figures 7–10, and generally are self-explanatory.[24] The key point is that the AOC's peacetime assigned strength permits no more than single manning of these positions; 24-hour manning and the increased work load of actual operations require that these positions be augmented. Let us turn now from functional organizations to how the organizations function.

How the Air Operations Center Functions

Having discussed how the AOC is organized in both peacetime and wartime, we now discuss how the AOC contributes to the AFCC/JFACC's performance of the planning and tasking, directing and monitoring, and communications functions.

Planning and Tasking

Within this function, the AFCC/JFACC performs two essential tasks. The first is development of the general direction for air operations and the accompanying apportionment and allocation decisions. The second is development and transmission of the air tasking order to assigned units. Before any discussion of weight of air effort can occur, the AFCC/JFACC must ascertain the objectives of the theater campaign and the concepts of operations of the naval and land components. (Let me hasten to add that this general discussion does "not" presume which of these efforts—air, land, or naval—will have primacy; the discussion simply recognizes that all efforts must be coordinated toward the joint force commander's overall theater objectives.) The combination of theater objectives, component concepts of operations, and specifics of the theater and available forces will lead the AFCC/JFACC to an air concept of
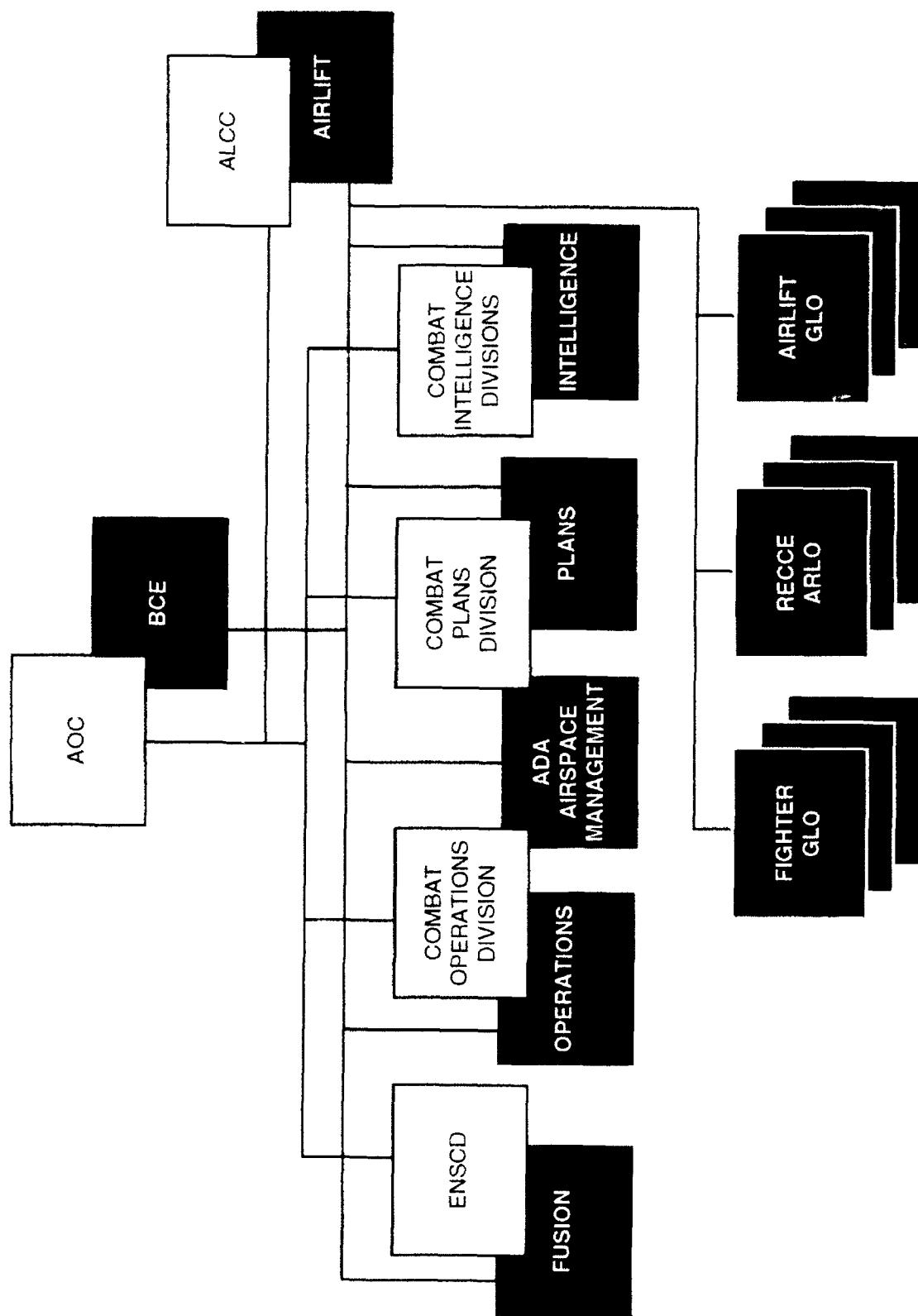
Source: Adapted from TACR 55-45, *Tactical Air Force Headquarters and the Tactical Air Control Center*, 8 April 1988

Figure 6. Army's Battlefield Coordination Element at the Air Operations Center
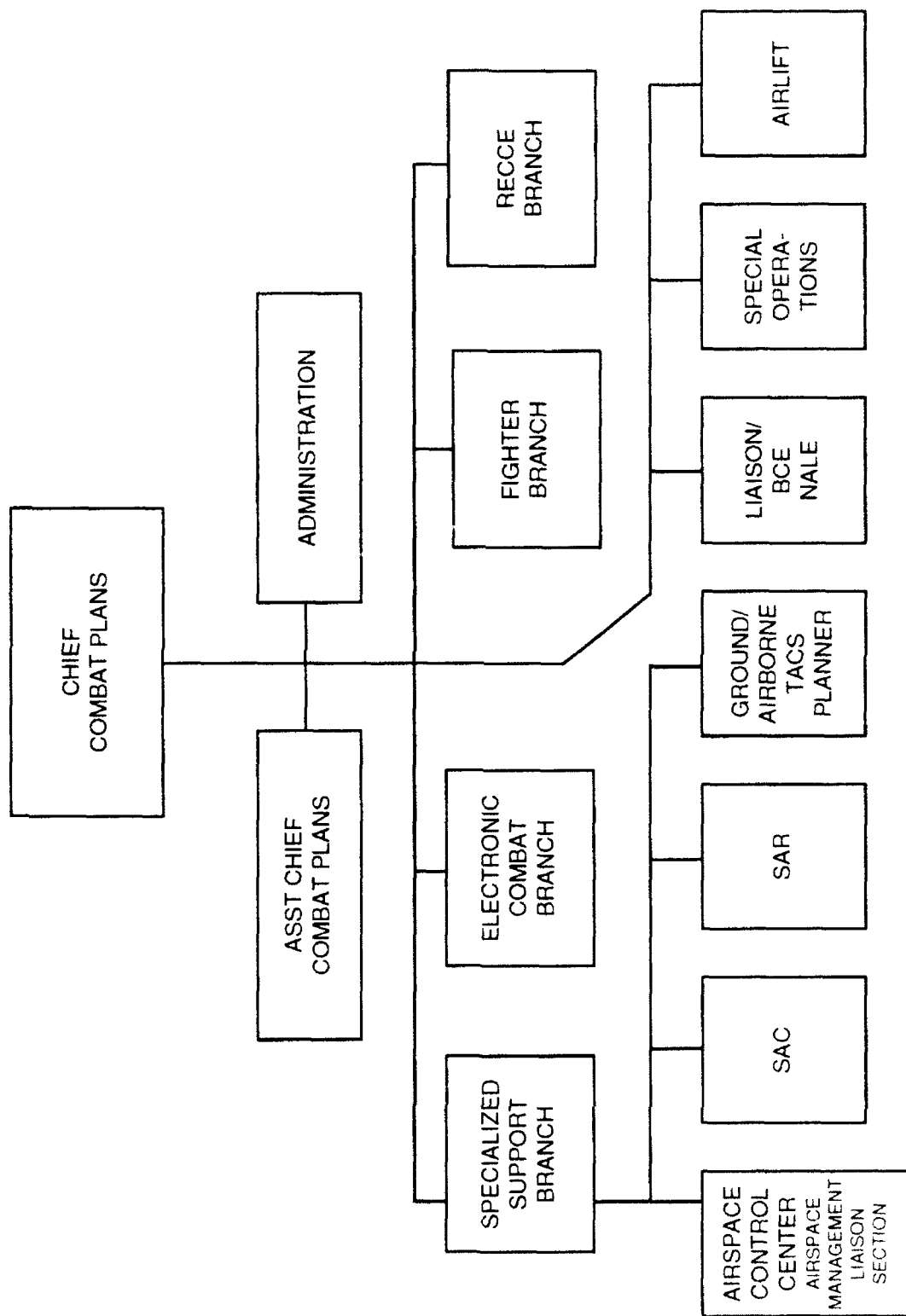
Figure 7. Air Operations Center Combat Plans Division

Source: Adapted from TACR 55-45, *Tactical Air Force Headquarters and the Tactical Air Control Center,* 8 April 1988

Figure 8. Air Operations Center Combat Intelligence Division
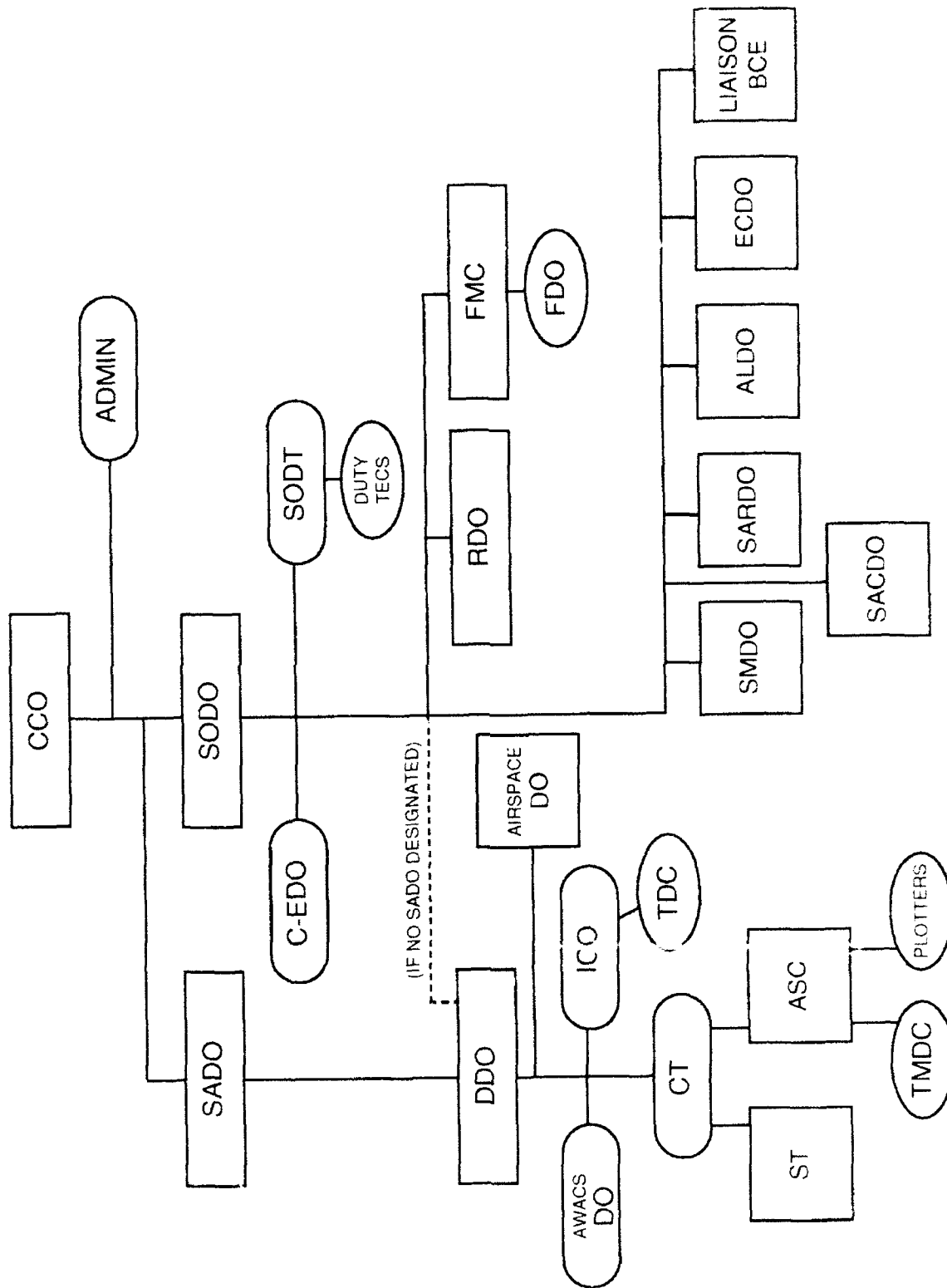
Source: TACR 55-45, *Tactical Air Force Headquarters and the Tactical Air Control Center*, 8 April 1988

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Source: Adapted from TACR 55-45, *Tactical Air Force Headquarters and the Tactical Air Control Center,* 8 April 1988

Figure 9. Air Operations Center Combat Operations Division
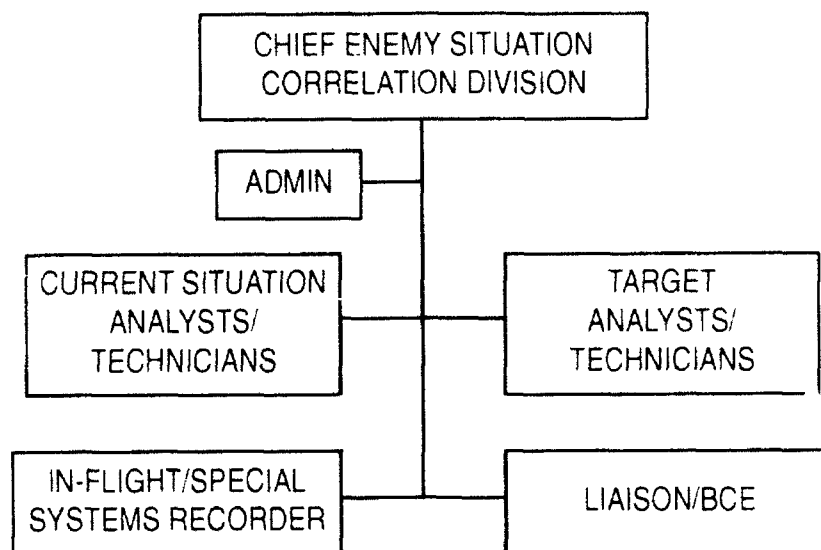
Source: TACR 55-45. *Tactical Air Force Headquarters and the Tactical Air Control Center.* 8 April 1988.

Figure 10. Air Operations Center Enemy Situation Correlation Division

operations. At this point, the apportionment and allocation processes take place. Figure 11 shows this process.

Apportionment and Allocation. Apportionment is the assignment of the weight of effort for air operations and is usually expressed as a percentage of effort. For example, a decision may be made to devote 50 percent of available sorties for the day to defensive counter air operations and the remaining 50 percent to interdiction. Apportionment is a gross indication of the priority to which air operations are to be committed. Allocation is the actual assignment of resources to missions and is ultimately done through the ATO.[25] The general rule is that the JFC apportions the force; the AFCC/JFACC allocates the force.[26]

In practice, apportionment and allocation decisions take place much like any staff action. The AFCC/JFACC, in developing the concept of air operations in response to the guidelines from the JFC and the other component commanders, develops and recommends an apportionment decision to the JFC. Once the JFC approves (or modifies) the apportionment, the JFC is responsible for ensuring that appropriate joint planning (read allocation) occurs. If a JFACC has been appointed, it falls to the JFACC to "do" the joint planning. (What the JFACC "does" is somewhat at issue; the JFACC will "coordinate and deconflict execution" [in JCS terms] or "plan" execution [the USAF position].)[27] If no JFACC is appointed, presumably each component does its own planning, and the JFC and staff coordinate and deconflict the results.[28] Regardless of the process, the result is overall strategy and employment guidance which the AOC translates to an actual plan.
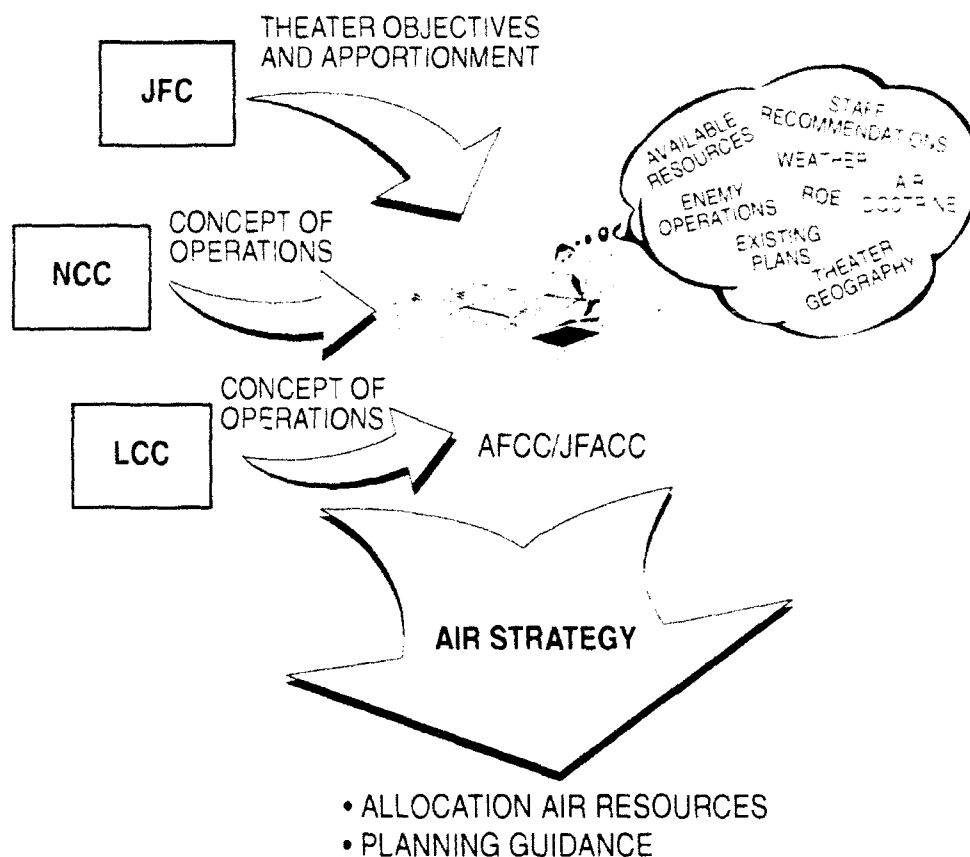
26

THEATER OBJECTIVES
AND APPORTIONMENT

JFC

CONCEPT OF
OPERATIONS

NCC

CONCEPT OF
OPERATIONS

LCC

AFCC/JFACC

AIR STRATEGY

AVAILABLE RESOURCES
STAFF RECOMMENDATIONS
WEATHER
ENEMY OPERATIONS
ROE
AIR DOCTRINE
EXISTING PLANS
THEATER GEOGRAPHY

• ALLOCATION AIR RESOURCES
• PLANNING GUIDANCE

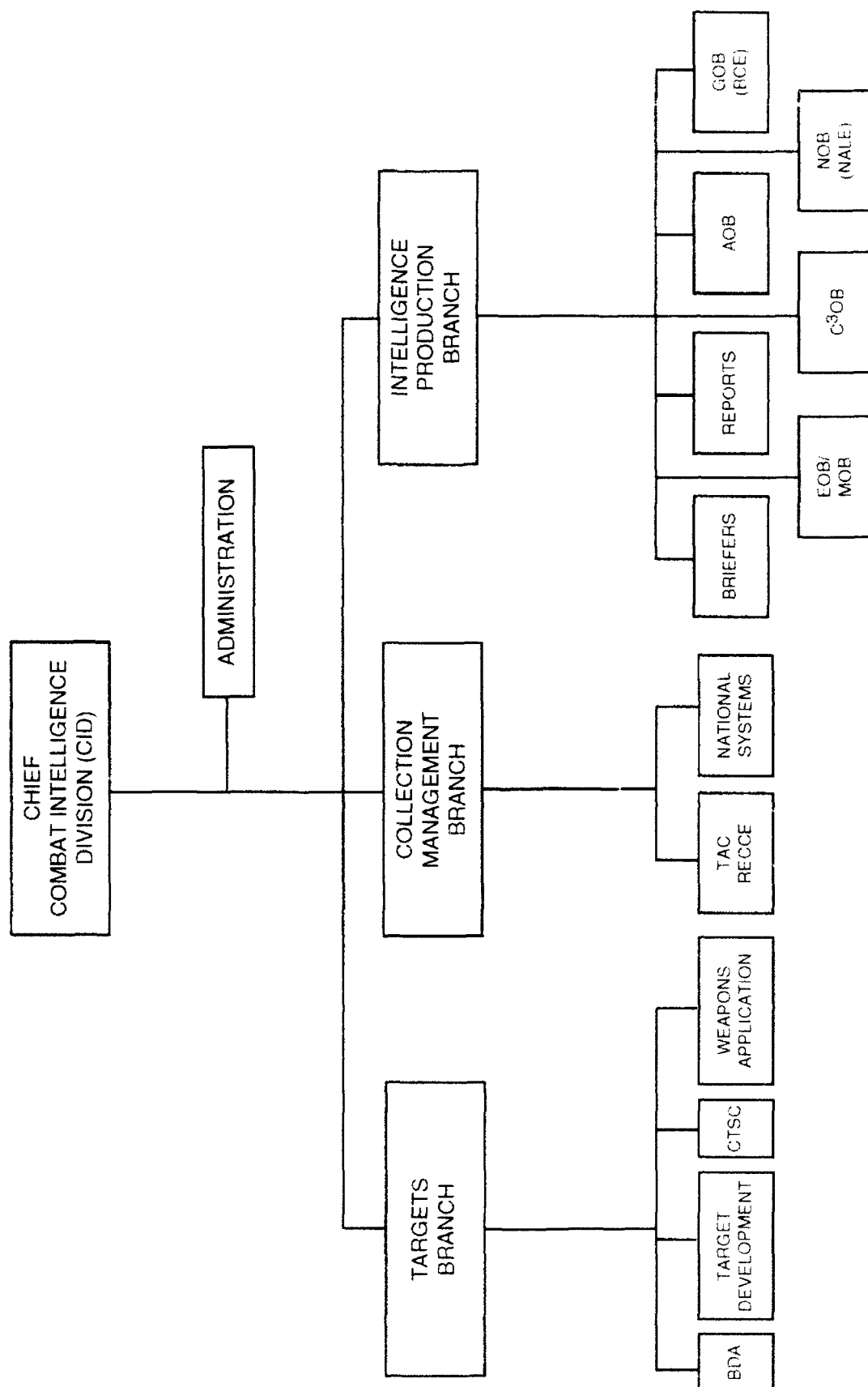Source: Adapted from TACR 55-45, *Tactical Air Force Headquarters and the Tactical Air Control Center*, 8 April 1988

Figure 11. Air Strategy Development

Development and Transmission of the ATO. The AOC develops specific allocations and mission taskings in the ATO based on the strategy and apportionment decisions. The combat plans and combat intelligence divisions are responsible for the detailed production of the ATO—a time-consuming process. As depicted in figure 12, the planners need to begin developing the ATO about 36 hours before the execution day. (The time the AFCC and JFC have to make their apportionment and guidance decisions is not constrained except for the need to provide guidance to the AOC at about the 36-hour mark.) At that time, the combat intelligence division uses its order of battle information and planning and target priority guidance from the AFCC/JFACC to develop a target list. The target list includes the recommended weapon types to achieve the desired level of damage. The combat intelligence division passes this information to the planners. This process takes about 12 hours.

The combat plans division, which includes the functional specialities shown in figure 7, augmented by fighter duty officers provided by units, then

	AOC				AFCC			
TODAY	+1		+2	+3	+4	+5	++
COMBAT OPERATIONS	COMBAT PLANS			AFCC	SENIOR AIR BATTLE MANAGEMENT STAFF		
EXECUTION	WRITE AIR TASKING ORDER	ALLOCATION		APPORTIONMENT (WITH JFC) PLAN AND DEVELOP AIR STRATEGY AND EMPLOYMENT GUIDANCE			
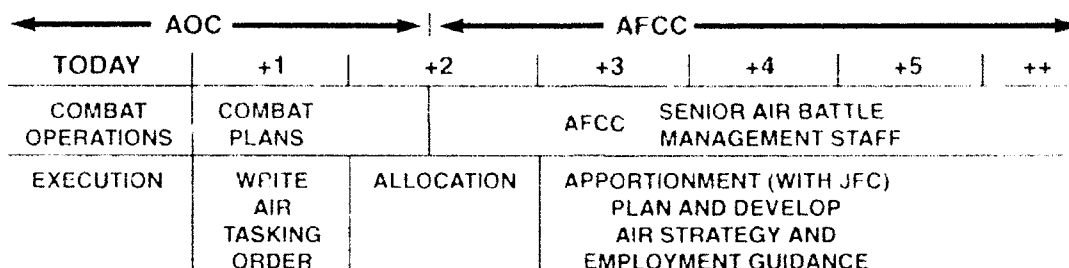
Apportionment. Assignment of total expected effort by percent or priority devoted to various air operations.
Allocation. Translation of apportionment into total number of sorties by aircraft type.

Source: Adapted from 602d TACCS. *Guide for ATO Development*

Figure 12. Air Tasking Order Development Cycle

develops the force packages necessary to attack the priority targets. This effort includes not only the identification of the principal tasked unit but also identification and scheduling of such supporting specialty forces as tankers, electronic warfare, and defense suppression assets. All assets must be identified, timing must be coordinated, and such specific mission execution information as identification information, radio frequencies, call signs, and controlling agencies must be identified.

This effort is not confined to USAF activity. The BCE and NALE are also actively involved in the planning process. Targets that are being attacked in support of specific ground or naval force objectives must be coordinated with the respective headquarters, especially if priority-of-effort decisions must be made. For example, if the AFCC/JFACC has only enough aircraft to attack one of two bridges the Army requested, it should be up to the Army commander to decide which will be attacked and which will be delayed until later. Land or naval component air assets included as part of the overall air effort must be blended into the plan. Such blending could be as simple as providing timing deconfliction or as complicated as ensuring that supporting assets from one service are joined with aircraft from another to conduct a mission. For example, Navy EA-6B electronic warfare aircraft may be needed to support a group of USAF F-16s in attacking a target. Or USAF tankers may need to refuel a Marine Corps attack package.

Another group of planners must also deconflict and specify how the airspace will be allocated among the various users. This problem not only includes airspace use by aircraft, both fixed and rotary wing, but also includes its use by things that fire into or through the airspace (air defense artillery, field artillery), or things that fall through the airspace (airdrop of supplies or personnel). Again, users may include any service component.

Finally, planners must decide how the use of the airspace to conduct offensive and support missions will be reconciled with the needs of the air defense

community. This community must be able to identify friend from foe and conduct effective air defense operations in the event of an attack. Thus planners must develop specific identification procedures to include use of electronic means of identification and provide safe passage routes and altitudes.

All of the information discussed above is translated into an ATO that includes specific mission information for tasked units, special instructions, and airspace control and identification information. The objective of the AOC is to be ready to transmit this information to the units not later than 12 hours before execution. Once the information is transmitted, the AOC shifts to directing and monitoring execution of the plan.[29]

Directing and Monitoring

Once the ATO is transmitted, the combat operations and enemy situation correlation divisions assume responsibility for directing and monitoring execution of the plan. Since the plan must be developed some 24 to 36 hours before execution, changes due to target changes, enemy activity, and actual status of friendly forces will be inevitable. The combat operations division is responsible for directing these changes through either fo nal changes to the ATO or by verbal orders directly to tasked units. The division is functionally organized with specialists in defensive operations, offensive operations, support functions, and communications. Again, elements of the BCE and NALE support the combat operations staff to coordinate the needs and activities of their respective service components.

There is no overall formal process for the activities of the combat operations staff. The section receives information in the form of intelligence updates, radar air picture information, mission reports from tasked units, and status reports from assigned units to monitor execution of missions and their results. This effort puts a premium on real-time and near-real-time communications among higher and lateral headquarters, assigned units, and intelligence sources.[30]

Communications

The system just described requires high-volume, secure, real-time and near-real-time communications systems to be effective. Connectivity must exist among the headquarters elements, between the service component headquarters, between the headquarters and the assigned units, and from intelligence sources both within and without the theater. A detailed discussion of the technical characteristics of available communications is not the purpose of this paper, but a summary of some important characteristics should be useful.

First, the Air Force component headquarters is not assigned any tactical communications. Support for the AFCH will come from either the AOC/AIS

(which has organic tactical communications) or from augmenting combat communications units. Since both the air control center squadron/AIS and combat communications units use the same types of communications, compatibility is not an issue.

Communication capabilities available include ultrahigh frequency (UHF), very high frequency (VHF), and high frequency (HF) radios; microwave wideband point-to-point communication systems capable of carrying voice, data, or teletype communications; wideband satellite communication systems capable of voice, data, or teletype communications; a tactical telephone switch capable of secure and nonsecure voice communications; a message center capable of interface with the military message network; and an interface system capable of receiving the tactical air picture from a variety of sources. The AIS also can receive intelligence data from a variety of sources.[31]

These communication capabilities, while diverse, do not include the capability to provide communications terminals to more than a few users within the TACS. Essentially, the air control center squadron/AIS can form a communications hub, but connecting links must be provided by augmenting USAF communications units, other service communications units, or by commercial or host-nation communications. While a number of Department of Defense (DOD) initiatives have resulted in better interoperability among service components, there are still differences that inhibit communications, especially with naval units afloat.

ATO preparation is done using the Computer-Assisted Force Management System (CAFMS). CAFMS is a computer-based system that allows the planner to develop the ATO in a data base and then transmit the data to CAFMS terminals at the tasked units. CAFMS also has planning aids to assist in development of the airspace control plan, which can then be transmitted. There is one immediate limitation of CAFMS. The system is peculiar to TAC; it does not represent an agreed standard even among USAF units, let alone other service agencies.

Capability to display a real-time air picture is also limited. In this case, the data-link formats and transmission media are regulated by the JCS and do represent an agreed inter- and intra-service standard. However, the display units at the AOC vary. The Twelfth Air Force AOC cannot display a real-time air picture. The Ninth Air Force AOC can display the picture, but only on a small display. At the present, there is no capability to display the ground situation in real time.

Access to intelligence information is provided via the AIS. In general, intelligence must be handled via separate communications due to the classification of the information. Much of the intelligence comes in the traditional format, that is textual message. However, new generations of displays (e.g., Constant Source and the Tactical Electronic Intelligence |TACELINT| Processor) are providing rapid access to information and are displaying information in more user-friendly formats, such as geographic displays. The chief limitation of this latter format is that the intelligence displays are separate from the air picture display, making correlation of information difficult.

Summary

This chapter summarized the organizational and functional characteristics of the air operations center and the supported Air Force component headquarters. Although changes in the air control system are under way, the emphasis was on the organization and functions covered in current USAF regulations and guidance. This is the organization the USAF used in recent contingencies. The next chapter discusses the operation of this AOC in exercises and contingencies.

Notes

1. Despite the deactivation of TAC and its replacement with Air Combat Command, the NAF commanders still serve as designated component commanders. Both the Ninth and Twelfth Air Force commanders retain the component designations described in this paper.

2. TACR 23-2, *Tactical Air Command Numbered Air Forces*, 6 December 1990, 4.

3. Ibid., 1-2.

4. Ibid., 1.

5. The reader who is interested in the historical development of the TACS may refer to Maj Thomas H. Buchanan, USAF, *The Tactical Air Control System: Its Evolution and Its Need for Battle Managers*, Research Report no. 87-1 (Maxwell AFB, Ala.: Air University Press, May 1987), 1–50.

6. AFM 2-7, *Tactical Air Force Operations—Tactical Air Control System (TACS)*, 2 February 1979, 2-1.

7. AFM 2-14, *US Air Force/US Army Airspace Management in an Area of Operations*, 1 November 1976, 3-1. See also, TACM 2-1, *Tactical Air Operations*, 15 April 1978, 3-7 through 3-8 for additional information.

8. Joint Pub 5-00.2, *Joint Task Force (JTF) Planning Guidance and Procedures* (Test Pub), 15 June 1988, IV-2 through IV-7.

9. AFM 2-12, *Airspace Control in the Combat Zone*, 22 August 1988, 6-7.

10. AFM 2-1, *Tactical Air Operations—Counter Air, Close Air Support, and Air Interdiction*, 2 May 1969, 3-3.

11. AFM 2-7, 2-2, 3-2.

12. TAC Concept of Operations, "Modular Tactical Air Control Center," Headquarters TAC/DOY, Langley AFB, Va., June 1990, 1. Hereafter referred to as CONOPS MTACC.

13. TACM 2-1, 3-4.

14. *Guide for ATO Development*, undated, used to orient augmentees to the 602d TACCS Combat Plans Division, Bergstrom AFB, Texas.

15. AFM 2-7, 3-1.

16. Gen Merrill A. McPeak, "For the Composite Wing," *Airpower Journal* 4, no. 3 (Fall 1990): 8.

17. TACR 23-25, *Tactical Air Control Center Squadrons*, 18 April 1990, 1.

18. TACR 23-14, *Tactical Intelligence Squadrons*, 23 February 1990, 1.

19. CONOPS MTACC, 1.

20. TACR 55-45, *Tactical Air Force Headquarters and the Tactical Air Control Center*, 8 April 1988, chap. 4. (Regulation has been rescinded and is unavailable.)

21. AFM 2-7, 3-1.

22. TAC Pamphlet 50-29, *General Operating Procedures for Joint Attack of the Second Echelon (J-SAK)*, 31 December 1984, 2-5.

23. AFM 2-1, "Theater Aerospace Warfare," final draft, 23 March 1992, 9.

24. For a more detailed description of the functions of the subsections, refer to Lt Col Robert J. Blunden, Jr., USAF, *Tailoring the Tactical Air Control System for Smaller-Scale Contingencies*, CADRE Paper no. 91-9 (Maxwell AFB, Ala.: Air University Press, February 1992), 3–12.

25. AFM 2-1, final draft, 23 March 1992, 5.

26. AFM 2-7, 1-3.

27. Joint Pub 3-03.1, *Joint Interdiction of Follow-on Forces [Follow-on Forces Attack (FOFA)]* (Test Pub), 16 June 1988, III-6 through III-7.

28. Ibid., III-7, V-6 through V-10.

29. *Guide for ATO Development*, 4–5.

30. TACR 55-45, chaps. 8, 9.

31. *System Operational Requirements Document (SORD) for a Contingency TACS Automated Planning System (CTAPS)*, TAF 305-88-I/II/III-A, 26 February 1991, Headquarters TAC/DRCT, Langley AFB, Va., 37–39. (Secret) Information extracted is unclassified.

Chapter 3

The Air Operations Center in Operations

Chapters 1 and 2 discussed the functions required to exercise command and control of air power in the theater by either the AFCC or the JFACC and the organization developed to satisfy the requirement—the air operations center. These discussions represent the theory of how the AOC operates. The critical reader will assert that the "real world" does not always operate according to theory. The key question is: Does the AOC operate in practice as we suggest it does in theory?

To evaluate this question, this chapter briefly reviews the command of air operations in two recent contingencies—Operation Just Cause and Operations Desert Shield and Desert Storm—to assess the AOC by comparing its actual performance to its theory. In so doing, we address factors that contributed to the success or failure of the system to perform its functions.

Operation Just Cause

Operation Just Cause represents the kind of limited contingency in which we might employ small detachments of Air Force assets or perhaps a composite wing. By examining this level of operation, we can develop a lower boundary of capability which the AFCC or JFACC would require in a command and control element.

Conduct of Operations

The commander in chief US Southern Command (CINCSOUTH) conducted Operation Just Cause as a joint force operation. The AFCC was the commander Southern Air Force (COMSOUTHAF), who is also the commander of Twelfth Air Force. Although Twelfth Air Force has an AOC under its control, the control of Operation Just Cause air operations was not exercised by that organization. Instead, Twelfth Air Force used elements of its forward echelons in Panama, including the SOUTHAF forward staff and the staff of the 24th Composite Wing (24 COMPW) to plan and control air operations.

Using 24 COMPW assets, the staff formed an air operations center in the 24 COMPW command post area at Howard AFB in the Panama Canal Zone. Emphasis was on using available assets and personnel, largely for reasons of security.[1] Limiting both the number of staff members and the types of equipment support provided from out of theater reduced the profile of operations in

the period of tension preceding the operation. All contingency planning was done with limited access. Participants from other supporting agencies were given only enough information to complete their tasks.[2] The goal of the AFCC was to preplan operations as much as possible in anticipation of a relatively short operation. To this end, conferences were held at Twelfth Air Force headquarters to discuss such things as airspace control and command and control arrangements.[3]

When the decision was made to initiate Operation Just Cause, selected members of the Twelfth Air Force staff from Bergstrom AFB, Texas, deployed to Howard AFB and augmented the AOC and the AFCC staff at the joint operations center at Quarry Heights, Panama. The AOC was officially activated at 0600 local on 19 December 1989.[4] After the initial phases of the operation were complete, the AOC continued to respond to taskings in support of ground operations, essentially acting as a combat operations and combat intelligence staff. Other than the preplanned phases, little attention was given to the planning side of conducting air operations. The AOC went through on-the-job training as the needs for coordination imposed by joint force air operations (USAF, Army aviation, special operations forces, and airlift) became evident. Problems of coordination with air assets were mitigated since these forces were all located at Howard AFB and face-to-face coordination was possible. On the other hand, the separation from the AFCC, who was located at the JOC at Quarry Heights, imposed coordination problems when the AFCC's decision was required. To its credit, the AOC coped with its limitations, and operations were successful overall.

Assessment

The 24 COMPW after-action report highlights a number of problems that arose during operations.[5] Lack of AOC-type experience in the planning and execution process resulted in requirements being overlooked and opportunities being missed. Even during the period of tension preceding the operation, personnel at the AOC and on the 24 COMPW staff failed to take advantage of tactical communication assets that had been provided to improve communications in the Canal Zone. Instead, they continued to rely on their more familiar but oversaturated base communications.[6]

Planning and Tasking. Once the first phase (six hours) of the operation was executed, the AOC had no clear picture of how operations would flow. In part, this uncertainty was a result of the dynamics of the battle, but it also resulted from an assessment made during prehostility preparations. That assessment was that due to the limited assets involved, no ATO other than the one covering the initial 24 hours of operations would be needed.[7] Apparently, when assets were added to the operation, this decision was not reviewed. After-action notes suggest that lack of familiarity with the kinds of planning functions that an AOC staff would anticipate was also a factor. This shortfall was not corrected until several days into the operation when a formal, joint process to request, prioritize, and task air assets was established.[8]

Finally, no provision was made for airspace planning and management beyond the initial phase of the operation, although this problem was subsequently addressed.

The BCE was not integrated into the AOC, but was placed in a corner of the center. Comments in 24 COMPW after-action notes state clearly that poor integration resulted from lack of familiarity with the BCE concept and that this element could have been extremely useful had its integration been anticipated and correctly executed.

The whole process was complicated by the physical separation of staff elements. The AFCC was at Quarry Heights with the CINC's staff. There was also an Air Force Forces (AFFOR) commander at Fort Clayton who was part of Joint Task Force Panama the force that actually conducted the operation. The AOC, the AFFOR's command element, was at Howard AFB.[9] The situation was improved several days into the operation when key SOUTHAF functions moved to Howard AFB and collocated with the AOC.[10]

Directing and Monitoring. The Air Force component staff did not appreciate the magnitude of the task facing the AOC before the start of operations. As a result, the layout of the AOC was believed to be inadequate to support the coordination necessary among the diverse elements involved in air operations. Failure to integrate the BCE also affected functions in this area. The 24 COMPW staff stated in after-action notes that having representatives from each of the deployed units who were familiar with their aircraft type would have improved the AOC operation. Such familiarity is a requirement the AOC organization addresses with its allowance for duty officers from each aircraft type and functional area and with its cadre staff representing a diversity of aircraft experience.

The Air Force made an effort to provide a radar picture to the AOC at Howard AFB by deploying an AN/TYC-10 message processing center (MPC)—a data-link interface center capable of receiving and displaying air picture information from a variety of tactical sensors, including the E-3A airborne warning and control system (AWACS). The air picture was then remoted to video displays in the AOC. Lack of training among the AOC personnel in how to read and interpret the display and the limited information available on low, slow targets reduced the utility of the air picture. Moreover, despite previous coordination, the AOC personnel were unaware that the MPC would be deployed.[11] The MPC was redeployed to the US after only 36 hours, even though AWACS liaison officers were continually required in the AOC.[12] The result was that all air data was developed by voice tell and manual display. Again, comments in 24 COMPW after-action report suggest this decision was made without discussion with even the local command and control personnel assigned to the wing.

Communications. The 24 COMPW after-action report suggests that the USAF element at Howard AFB was not fully cognizant of all the communications requirements established for the operation. The AOC was never fully exercised, leading the communications staff to underestimate the extent of support which would be required.[13] Some of the communication equipment

the AOC expected to have available was late arriving and was not in place at the start of the operation. This tardiness was in part due to late taskings as communication requirements continued to evolve right up to execution of the operation. The late decision resulted in selection of less-than-optimum equipment in some cases.[14]

The communication situation was also complicated by a "fog of war" factors. At the time of execution, US Southern Command (SOUTHCOM) was changing the supporting tactical communication unit from a USAF combat communications detachment to an Army signal unit. Caught in midstride, portions of the combat communications detachment reestablished part of their network in the hours before execution. Finally, communications suffered from the same failure to anticipate joint coordination requirements that affected air operations. A joint communications control center was not established until 10 days after the start of operations.[15] Until then, communication problems were worked among units with varying degrees of success.

Summary

The difficulties the AOC faced in Operation Just Cause were a direct result of not using knowledgeable command and control personnel from the AOC and other elements of the TACS to assist in planning and execution functions.[16] Although the need to restrict access and limit the amount of equipment deployed in-theater for security reasons is clear, failure to rely on available staff expertise resulted in underestimating requirements for command and control and overlooking assets that could have been made available to improve operations.

This assessment is not an attempt to detract from the superb job done in Operation Just Cause, but it is important to review the operation because Just Cause fits the limited scenario the USAF is likely to face in the emerging "new world order." As established in the first chapter, regardless of the size of the force, the AFCC must perform certain functions in the conduct of air operations. Whether or not we have the right concept for addressing these small contingencies will be discussed in the next chapter.

Operations Desert Shield and Desert Storm

While Operation Just Cause represents the less intensive end of the conflict spectrum, Operations Desert Shield and Desert Storm represent that part of the spectrum referred to as major regional contingency—a more intense conflict level. Examination of the way air operations were controlled from the air operations center or an equivalent level during the operations should help identify problems in the theory of the AOC established in chapter 2. Unlike the AFCC in Operation Just Cause, the AFCC in Operations Desert Shield and Desert Storm had planned to deploy an AOC in the event of a contingency and did so.

Conduct of Operations

The AOC and its supporting elements were deployed to the theater in the early phases of the operation. Initially, some elements of the AOC were located in Royal Saudi Air Force (RSAF) facilities, and some elements of the AOC used the mobile shelters organic to the unit. Ultimately, the whole AOC operation, as well as the Air Force component headquarters, was located within fixed facilities. This arrangement improved coordination between the various planning elements, between the plans and operations functions, and between the US air operations and the RSAF. Further, the physical security of the operation was improved. However, this arrangement required the remoting of more communications than had been experienced in exercises.[17]

Despite these small adjustments, the consensus among all the AOC participants at both the NAF and AOC staffs was that organizational arrangements were very much as they had practiced them in exercises. The joint force commander was the commander in chief Central Command (CINCCENT), and also served as the land component commander. The US Air Forces, Central Command (Ninth Air Force) (CENTAF) commander was also designated the joint force air component commander (JFACC). The AOC was collocated with the AFCH.[18] The biggest difference between the actual operations and those exercised was the scope and size of the effort.

Planning and Tasking. In general, arrangements for planning and tasking followed the description of operations laid out in TACR 55-45. Given the long period of buildup before the start of operations, the combat plans staff found themselves tasked with production of the daily flying schedule for USAF units in-theater. A separate planning group was established to deal with war plans, in the event that operations had to be conducted, and to adjust plans as new forces were added to the theater. This latter group, formed from out-of-theater personnel and selected personnel from the NAF and AOC staffs, became known as the "Black Hole." Once combat operations commenced, the Black Hole continued to be the initial focal point for planning, taking the priority guidance from the JFC and JFACC and translating it to a priority target list. This target guidance was then passed to the combat plans and combat intelligence staffs to be translated into the specific tasking contained in the air tasking order.[19]

Figure 13 shows the process of developing the ATO. Note that the process started a full 48 hours before execution of the ATO. The initial day of this process was devoted to discussions among the joint staff about the general conduct of the campaign and in development of the theater commander's guidance. This was the period when the group in the Black Hole made their input. The combat plans and combat intelligence staff actually got the final information for planning 24 hours before the targeted ATO release time. Initially, the staff failed to meet the release time because of continuous changes introduced into the ATO in response to battlefield conditions and intelligence inputs. Finally, the staff adopted a policy of freezing inputs early enough to complete the ATO and funneling subsequent directions to the combat
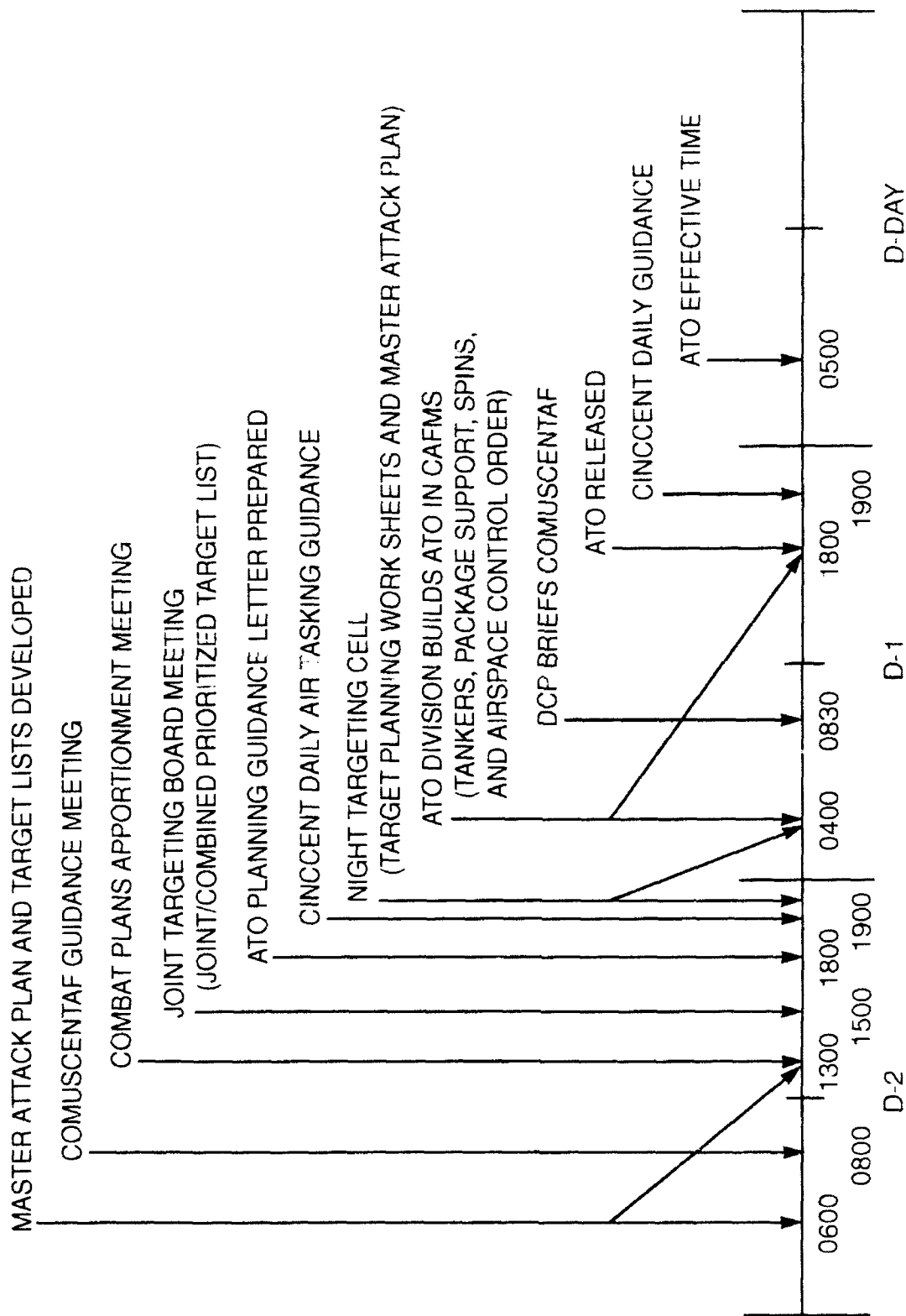
Figure 13. Operation Desert Storm Air Tasking Order Targeting Process

operations staff. This staff made changes verbally or published changes to the ATO as necessary.[20] The requirement to respond to rapid combat changes put a premium on having liaison officers who understood tasked unit capabilities.

Directing and Monitoring. Again, the organization to conduct these functions was very similar to that laid out in TACR 55-45 and discussed in chapter 2. This organization contained a number of duty officers who provided expertise in specified functional areas, such as search and rescue, and in specific weapons systems. In addition, liaison officers from other services, such as the BCE and the NALE, were required especially since the AFCC was serving as the JFACC. Finally, although coalition arrangements are not explicitly discussed in USAF guidance, the fact that Operations Desert Shield and Desert Storm was a coalition campaign also meant that liaison officers from other nations who were providing air forces were also desirable. The organization for combat operations that came to exist is shown in figure 14.

Although the nature of this organization was not different from what the AOC and NAF staffs expected, the size of the operation exceeded their expectations. For both the planners and operations personnel to be effective, experienced liaison officers were needed. On the average, at least four liaison officers were needed for each aircraft type or functional position to cover 24-hour operations. In some cases, where there were significant differences within an aircraft type, some additional liaisons might be required. For example, there is a difference between F-16s and F-16s that have low altitude night targeting infrared navigation (LANTIRN) capability. For the most part, duty officer positions that could not be filled by AOC or NAF staff personnel were provided by the units in-theater.[21] The layout of the combat operations staff area is shown in figure 15.

Because Operations Desert Shield and Desert Storm were combined operations and the AOC served as the operations center for the JFACC as well as the AFCC, liaison officers from other services and the international components were required. The BCE provided Army representation according to existing USAF and Army procedures. The Navy and Marine Corps liaisons provided coordination with the forces afloat (including embarked Marine units) and with the Marine Central Command (MARCENT) forces ashore respectively. Finally, international liaison officers representing the principal air forces from the coalition were present.[22] These positions are also reflected in figure 15.

Communications. A combination of tactical and commercial communications connected the AFCH/AOC to higher headquarters, lateral headquarters, and assigned units. Although the system grew slowly, the final network represented a reasonably robust system that allowed the AOC to communicate effectively with tasked units. Common communications minimized the problems of communicating with USAF units and was essential to

DCO/CCO

ADMIN

SADO — ENSCD

DDO — ADA — AIRSPACE

SARDO

ALDO

SODO

BCE

SACLO — CASDO — ECDO — FDO — ALLIES

DDO:
- C/STs
- MPC
- AWACS LO

SACLO:
- B-52
- TKRS

CASDO:
- ABCCC
- A-10
- F-16

ECDO:
- F-4G
- EF-111
- CC
- VS

FDO:
- F-16
- F-15E
- F-15C
- F-111
- F-117
- MARLO
- NAVLO

ALLIES:
- RSAF
- RAF
- FAF
- CAF
- IAF

Figure 14. Operation Desert Storm Air Operations Center Combat Operations

Figure 15. Operation Desert Storm Air Operations Center Combat Operations Facility
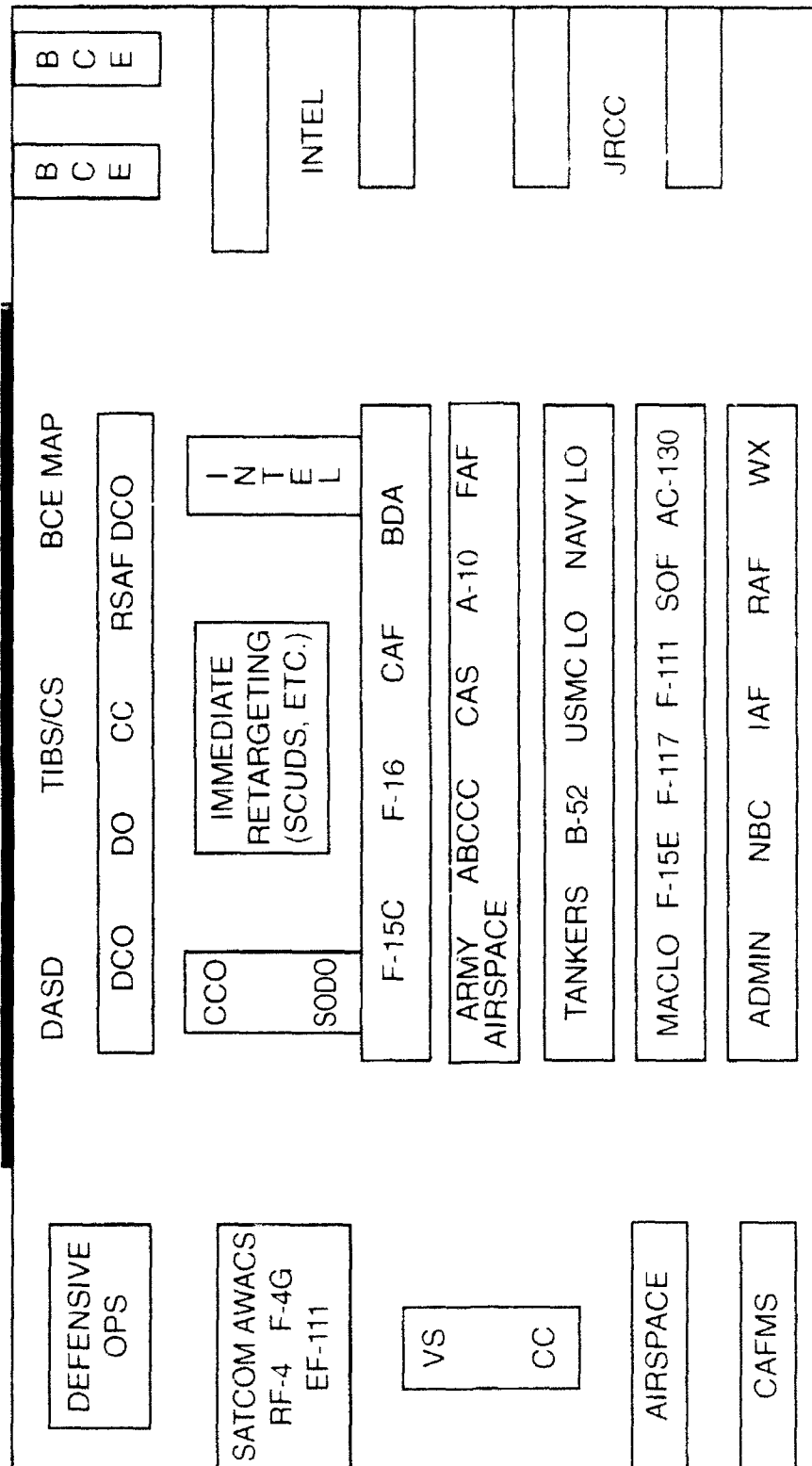
Source: Adapted from North Air Force Deputy Director for Current Operations briefing

distribution of the ATO, done via CAFMS, and to the functioning of the liaison officers in combat operations. This latter effort put a premium on secure voice communications to allow the duty officers to alert tasked units to changes coming in the ATO and to change tasking in real time if necessary.[23]

Voice communications with Army units and Marine Corps forces ashore were also generally good due to improvements in tactical communication system standardization. However, the Army and Marine Corps lacked the CAFMS terminals essential to receiving tasking instructions and the airspace control information crucial to conducting flight operations and artillery/rocket/missile firing. Army units resorted to such secondary sources as collocated USAF units to obtain information.[24] Communications with Navy forces afloat were limited. Although communications were possible, the ATO ultimately had to be physically taken to the carriers because of limitations in communication capacity. Additionally, poor communications limited the ability of the Navy liaison officers to make changes in the tasking for Navy forces, reducing flexibility in the employment of those forces.[25]

Assessment

The brief discussion of AOC performance in Operations Desert Shield and Desert Storm, along with the diagrams presented, shows that the organization used was fundamentally consistent with the organization described in existing TAC regulations. US forces relearned the lesson that an operation of this size and scope requires a significant investment in command and control personnel and equipment. The Ninth Air Force director of operations estimated that about 2,000 people were involved in the headquarters operations at Riyadh, including supporting communications and maintenance personnel. Reviewing the positions in figure 15, one can see that at least 50 people were required on a single shift in just one AFCH/AOC suborganization. This number far exceeds the number of personnel assigned to the air control center squadron and the NAF on a peacetime basis; augmentees are required.

Of particular concern were the senior officers required to fill such supervisory positions as director of combat operations or director of combat plans. Many of these personnel were not predesignated. Instead, the senior NAF staff members selected candidates from personnel they knew. For example, the Ninth Air Force director of operations requested that the Blue Flag director of operations serve as a director of combat operations since he knew him and knew he had been involved in numerous US Central Command (CENTCOM) exercises.[26] While this process does not mean that the people selected will not perform well, it does mean that key personnel might have to be trained in procedures before they become fully effective. In the case of Operations Desert Shield and Desert Storm, time was available. Other contingencies might not permit this luxury.

Large numbers of personnel also mean large amounts of space required. The NAF and air control center squadron staff members the author talked to emphasized the value of the facilities provided. Ample space allowed the

sections to operate in the same room and eased coordination among the duty officers.[27] This requirement for space is something we must bear in mind as we develop the new AOC systems.

Planning and Tasking. Overall, planning and tasking functions were carried out much as anticipated. Much attention has been focused on the role of the Black Hole in the development of the air campaign. The Black Hole seems to fit functionally into the planning gap between the AFCC and the AOC. Chapter 2 discussed the distinction between planning done by the AFCH staff, which centers on development of campaign priorities and guidance, and planning done by combat plans and combat intelligence, which focuses on assignment of aircraft and support to attack specific targets or to perform specific missions (i.e., the development of the ATO). The Black Hole, which responded directly to the JFC and JFACC, performed the AFCH function and passed guidance to the director of combat plans, who developed the ATO. Therefore, this function seems to fit within the framework established in existing procedures.[28]

Although chapter 2 discussed the apportionment and allocation process, there was a consensus among the participants that this process was not meaningful in planning Operation Desert Storm. Instead, the JFACC and his planners took the priority guidance provided by the JFC and assigned missions to carry out the taskings. The apportionment (assignment of the weight of effort for air operations expressed as a percentage of effort) was an after-the-fact assessment.[29] Two cautionary remarks are necessary. First, ground operations were not run concurrently with air operations in the early phases of Operation Desert Storm. Second, in a relative sense, there was no scarcity of air resources to support tasked operations. Still, the concept of an apportionment cycle may bear review.

Development and distribution of the ATO followed closely the expected cycle described in TAC regulations and was generally regarded as a useful means to coordinate the diversity of activities in the theater. A comparison of figure 12 in chapter 2 and figure 13 in this chapter shows that the theoretical cycle and actual cycle closely correspond. This detailed coordination cycle was essential in ensuring appropriate support was provided to missions (e.g., tankers, electronic combat support, etc.), in ensuring that the diversity of airspace use requests could be deconflicted, and in organizing the flow of more than 3,000 sorties per day through the airspace. However, this does not mean that the system was perfect.[30]

Moving or time-sensitive targets pose a problem when the joint force commander and his targeting cell begin discussing target priorities 48 hours before mission execution. Even the air tasking order is published in the 24 hours before execution, so the latest target information is no better than 24-hours old when the written ATO reaches the field. The result is that the director of combat operations must direct changes in real time, a process that can be frustrating to the tasked unit, but one that is essential to a responsive air control system. All participants acknowledged that at least part of this

problem can be addressed by the AOC staff themselves if more time were taken to assess the difference between timely intelligence and intelligence on time-sensitive targets. That is, just because you have received immediate intelligence on a target does not mean that it is a target that must be immediately hit.

Personnel at tasked units also noted that the ATO initially were too detailed, even going to the level of assigning initial points on targets. However, the personnel agreed that these problems rapidly resolved themselves as the conduct of dynamic operations became more complex, and guidance was reduced to essential information leaving mission details to the tasked units.

Finally, timeliness of the ATO was a problem, especially for the night flying units. If the ATO did not come out on its advertised schedule, the night units had to respond in a short planning cycle or to verbal tasking through the liaison.

Duty officers and liaison officers were important. They were the first line of defense against inappropriate unit taskings. They served a crucial role in alerting their units to changes in the ATO or operational priorities that might affect or change the tasked mission. Based on duty and liaison officer inputs, the wings knew that the changes being directed were founded on valid reasons and that higher headquarters was aware of the magnitude of the effect that such changes might impose. However, the wings were not aware of the scope of augmentation required for duty and liaison officer positions before the start of operations, and some personnel tasked for these positions were naturally resentful of being pulled from units as they were preparing to enter combat. Since personnel were unprepared for the tasking, they had to be trained to perform the function, something time allowed for in this situation. This need for augmentation, both at the duty officer and senior officer level, may need to be more formally addressed in the future.[31]

Directing and Monitoring. Like the planning and tasking functions, the directing and monitoring functions operated much as anticipated. The service liaison elements each proved their worth, although both experienced problems. The BCE function is part of both US Army and USAF doctrine, and as such its presence was anticipated. In fact the original BCE came from the XVIII Airborne Corps and was a group the NAF and AOC staffs had exercised with routinely. However, Army doctrine anticipates that corps commanders will run their war, and as more corps were added to the battle line, their interests began to conflict. The BCE, coming from XVIII Airborne Corps, was not regarded as actively meeting the needs of each of the corps commanders. Further, although the JFC also served as the land component commander, he was not necessarily available to settle routine disputes. Further, the Army Central Command (ARCENT) staff was not manned well enough to coordinate with all elements. Since the BCE had to represent more than one corps, and there was sometimes no one to arbitrate conflicting corps priorities, the JFACC and his staff sometimes resolved disputes.[32] The Army may need to address the manning of the echelons above corps (EAC) to ensure that adequate staff is provided to effect deconfliction among subordinate corps, espe-

cially if limitations in the Army's command and control system persist.[33] The issue of having a single LCC (rather than an Army component and a Marine Corps component if the Marines are deployed ashore) may also need to be addressed in light of the apparent success of the JFACC concept.

The problem of moving and time-sensitive targets carried over to the directing and monitoring function. The system was flexible enough to handle diverts and retargeting as problems arose. However, a better method for handling these activities may need to be addressed. An additional effect of diverting missions that arose in this function was that bomb damage assessment of divert targets was sometimes missed since the reconnaissance sorties scheduled to do the BDA were unable to respond to the target change.[34]

Within the combat operations area were two types of air situation displays. The first came from the E-3A and other radar sensors, and it showed the air picture information. The other displayed one of two intelligence-derived displays. The combat operations staff assessed both of these displays as extremely useful in keeping the air commander aware of the flow of the battle. The intelligence picture was also useful, but in some cases since different track numbers were used, different update rates were used, and the displays were on separate screens. Correlating the two pictures was difficult. In particular, some Constant Source information was said to suffer from this shortfall, making other sensors sometimes more useful.[35]

The problem of responding to changing targets led to the use of airborne platforms to provide divert information to strike packages en route to target. The airborne battlefield command and control center (ABCCC) was used in this manner. The consensus among the NAF and AOC staffs was that this platform needs a real-time air picture to be more effective in this role.[36] Personnel flying missions, however, were more critical of the utility of the ABCCC, citing problems in communicating with the aircraft due to antenna placement on the airframe.[37] NAF and AOC personnel confirmed these problems, but saw a role for the platform in assisting the AOC in extending its control reach. To this end, they also cited the utility of the airborne command element (ACE) on the E-3A, and the possible future role of joint surveillance target attack radar system (J-STARS) in providing forward control.

Finally, experience from exercises led the combat operations staff to expect consistent and reliable BDA with which to adjust the conduct of the campaign as missions proceeded. In-flight reports from close air support and interdiction missions in support of ground forces generally came in. However, coverage of deep targets was sometimes sporadic. The staff suggested that at least part of the reason was that when targeting for deep attacks had to be changed rapidly, reconnaissance sometimes could not be adjusted as rapidly and coverage was lost. The combat operations staff began to supplement intelligence sources with information from mission crews obtained via the CAFMS terminal to get more rapid update.[38] Supplementing was possible because the units were already collecting data on their missions. Unit commanders related that they received little BDA from higher headquarters. To

preclude reattacking targets they had already destroyed, the units began to use mission-results video to keep track of such things as shelters destroyed at given airfields.[39] The result is that when data was called for, it was available.

Communications. Like the other functional areas, the communications functions generally went well. The volume of communications needed to conduct a centralized campaign was large and included both data and voice communications. The liaison officers needed real-time communications with tasked units to execute the options necessary to keep up with the changing situation.[40]

This system did not grow immediately, but developed as units were deployed into the theater and as command and control elements were added. Both the NAF and AOC staffs expressed the need for dedicated specialists at the AFCH and AOC levels to exercise control over the establishment of the command and control system as it developed. Initially this function was not included in the AOC structure, but a functional group developed in response to the perceived need to ensure that assets were used to the best advantage.[41]

Distribution of the air tasking order via CAFMS was slow due to ATO length, but units with CAFM terminals and compatible communications were at least able to interact with the system and receive the ATO and its changes. Navy and Army units below corps level were unable to receive the ATO in a timely fashion because they lacked high-data-rate communications and compatible CAFMS terminals. Other services and non-TAC units had to be provided with terminals and training in their use. The Navy problem was solved by carrying the ATO to the carriers by aircraft. The Army tried to get the ATO from such secondary sources as nearby USAF units. Time available before the start of combat operations allowed training time for units unfamiliar with CAFMS. For future operations, the services need to agree on a standard format for ATO development and transmission.

While the air picture at the AOC was useful, there was only one occasion when the entire theater air picture was actually displayed at the combat operations center. Although the services agreed some years ago to data-link protocols and management procedures, failure to exercise net discipline and to establish a clear, single-point net manager meant that local sensors were more concerned with maintaining their local coverage than with contributing to the overall display. This issue of link management needs more attention.[42]

Other Issues

We have now explored two recent contingencies to see if the AOC was employed as the system was prescribed in TAC and Air Force doctrine. In the case of Operation Just Cause, the AFCC decided to use an in-theater command and control configuration rather than elements of his assigned TACS. However, as we have also seen, this decision did not negate the need for the system's functions to be performed. In the case of Operations Desert Shield

and Desert Storm, the TACS elements, especially the AFCH and the AOC, were employed essentially as configured. While it is easy to assume that Twelfth Air Force's decision not to use the TACS stemmed from the availability of an in-theater option and the desire to preserve operational security, the problems in establishing and operating the system give rise to questions as to whether any other factor may have influenced the choice.

A review of tactical air control wing histories for the previous 10 years, along with a review of the theater taskings, leads the author to suggest two additional reasons for the decision not to use the TACS. Faced with the problems of operating in a theater (CENTCOM) without an established US command and control system, Ninth Air Force planned to use its TACS system for control of forces. Twelfth Air Force, on the other hand, had a forward headquarters in its theater (SOUTHCOM) and had the beginnings of a regional command center (the Southern Region Operations Center). Therefore, the incentive to use its mobile system was less.

The second reason is a function of the first. Because of the perceived need, the Ninth Air Force staff worked closely with its supporting air operations center. This developed the kind of rapport that led the staff to count on AOC support when necessary; the AOC staff were "knowns." As related earlier, the Ninth Air Force director of operations suggested that in a pinch, one relies on people whose performance is known. The rapport between Twelfth Air Force and its AOC, on the other hand, may have been less complete due to a lesser degree of routine interaction.

A review of the exercises undertaken by the Ninth Air Force and Twelfth Air Force TACS adds credence to this thesis. When Ninth Air Force staff members were asked if their experience in Operations Desert Shield and Desert Storm was fundamentally different from their exercise experience, they replied that it was not. All personnel the author talked to at both the NAF and AOC indicated that they had completed a Blue Flag exercise shortly before Operations Desert Shield and Desert Storm. This exercise had covered a similar contingency, so their staff procedures were well developed.[13] Review of the tactical air control wing history revealed this to be part of a long-term trend involving JCS-directed exercises, TAC exercises, and Ninth Air Force exercises, all of which allowed the NAF and AOC staffs to develop and refine procedures.

Unified command exercises included the Gallant Knight/Gallant Eagle series which explicitly exercised CENTCOM scenarios and involved both the NAF and AOC staffs and equipment.[44] Exercises in the Solid Shield series, a commander in chief Atlantic Command (CINCLANT) series, also afforded opportunities for the NAF and AOC to conduct live exercises.[45] Finally, the Bright Star series allowed the Ninth Air Force and AOC staffs to see the theater and its problems firsthand, confirming the need for a command and control system.[46]

In addition to the unified command exercises, Ninth Air Force ran a number of exercises explicitly intended to test its command and control system and to ensure that the system would be able to support the AFCC in a

contingency. Beginning in 1980, and continuing every year under a variety of code names, these exercises allowed the NAF and AOC to explore operational problems in the command and control system. Many of the exercises involved a live flying segment tasked by the AOC. Some of the exercises, called Quick Frag, were nothing more than training exercises for AOC augmentees, including NAF staff members, to teach them how to develop an ATO.[47] Finally, annual Blue Flag command post exercises were conducted with a CENTCOM scenario allowing the NAF and AOC staffs additional opportunities to work problems.[48]

The Twelfth Air Force exercise history for its tactical air control wing pales by comparison. In general, there were no consistent higher headquarters-directed exercises on the scale of the Gallant Knight/Gallant Eagle series. Some Bold Eagle exercises were held in the early 1980s, but were not continued.[49] Other joint service exercises, such as the Golden Sabre series, called for a tailored AOC element with a limited role rather than a full AOC with AFCC staff.[50]

Recognizing the need to exercise the TACS, Twelfth Air Force developed an exercise series involving the AOC and supporting TACS elements, along with Army units and live flying. The exercise series was known as Cactus Arizona and ran from 1985 to 1987 on an annual basis. Unlike the exercises in Ninth Air Force, the senior headquarters supporting the exercise was the 836th Air Division, not the NAF. In any event, the series was discontinued for funding reasons after 1987.[51]

Blue Flag also did not afford Twelfth Air Force system the same opportunities offered Ninth Air Force. There was no regular regional Blue Flag for Twelfth Air Force. The AOC staff regularly attended Blue Flag exercises, but the scenarios represented contingencies (e.g., NATO contingencies) in which the AOC functions were not necessarily exercised. In fact, in one exercise, the AOC staff was asked to curb its activities to more closely follow its NATO organizational counterpart.[52]

Summary

This review of the AOC in operations establishes two major points. First, regardless of the organizational configuration selected (whether or not one calls the configuration AOC), the functions established in chapter 1 must be performed. These functions become more critical as one introduces forces from other services or nations, and they must be performed regardless of the number of USAF forces employed. (There were relatively few USAF units in Operation Just Cause.) This point seems to have implications for the composite wing, even if it is the sole USAF element in a contingency.

The second major point is that the AOC organization works although it has some shortfalls. Experience in Operations Desert Shield and Desert Storm

supports this assertion. The next chapter presents recommendations to improve the system in light of recent US experience and the changing Air Force.

Notes

1. 24th Composite Wing After-Action Report (U), undated, Deputy Commander for Operations, 2. (Secret/No Foreign Nationals [NOFORN]) Information extracted is unclassified.

2. I was sent to Panama in November 1989 to survey locations for an AN/TYC-10 message processing center (used to display an air picture from other tactical sensors, including E-3A) and to determine how to provide remote displays to the AOC. I was permitted into the AOC to conduct the survey, but was allowed no information about the purpose of the support, when such support might be required, or where the platforms that would provide the input would be located.

3. 24th Composite Wing After-Action Report (U), 2. (Secret/NOFORN) Information extracted is unclassified.

4. Ibid., 3.

5. Ibid., 4–7. The subsequent comments on operations in this section are based on the assessments made by various 24 COMPW/DO agencies in their after-action reports. Where other sources or my own experience corroborate these comments, I have provided additional references.

6. During my visit to the AOC in November 1989, I noted that the center had secure tactical telephones provided by the 31st Combat Communications Squadron. I asked the staff how they liked the phone and was told they did not like it. Just then the phone rang, someone said, "There's the bat phone again," lifted the receiver, pulled the knob zeroing out the crypto setting, and (understandably) got no connection. The person who answered the phone, having disabled it, got no answer, hung up, and said, "There's never anyone on it." When I talked to the 31st Combat Communications Squadron detachment commander, she told me that what I had seen was a recurring problem despite training and instructional handouts. The loss to the AOC personnel was not just the inability to use the secure communications provided within the Panama Canal Zone, but also was the inability to access defense switched network (DSN) lines extended directly from the continental United States (CONUS) through the tactical switch. At a time when staff members were waiting hours (or abusing precedence) to get DSN connections to CONUS, those who knew how to use the system had access immediately through the tactical switch.

7. 24th Composite Wing Staff Summary Sheet, "Command and Control Procedures between JTF-PM and USSOUTHAF-FWD," 15 November 1989.

8. Air Force Forces (AFFOR) Operating Instruction (OI), *Air Asset Allocation Process*, 26 December 1989. This was published six days after operations commenced.

9. Briefing, "Joint Task Force South," undated. Copies of slides only.

10. Message, 231645Z Dec 89, chief of staff, USSOUTHAF, to Joint Chiefs of Staff, 23 December 1989.

11. When I went to the AOC at approximately H-16 to confirm that the display was to go to the same location we had surveyed in November, I was met with surprise since the plan no longer called for the MPC's use. At this point, the equipment was en route. I was subsequently told that the use of the MPC was disapproved at the Organization of the Joint Chiefs of Staff level because "message centers" (text type) were already in-theater. Equipment unfamiliarity was not confined to the AOC.

12. Message, 221921Z Dec 89, commander, Joint Task Force South to Joint Chiefs of Staff, 22 December 1989.

13. 1978th Communications Group (CG), After-Action Report, "Operation Just Cause," undated.

14. As part of our deployment in support of Operation Just Cause, my unit was tasked to provide a suite of UHF radios which could be remoted to the AOC. The tasking was levied three to four weeks before the operation, and we had to obtain equipment from other units in

our wing to modify our radio sets for this function. When the equipment was deployed, no one had considered how and where these radio heads would be installed, nor had training been provided (the equipment did not arrive at Howard AFB until H-12). Installation of UHF radios was one more chore for an overtasked AOC. Some combat communication elements had equipment that could have been used for this purpose without modification.

15. 1978th CG After-Action Report, undated.

16. The Just Cause temporary duty list for 2 January 1990 shows only four AOC personnel out of a total of 30 deployed from Bergstrom AFB. The rest were from the tactical intelligence squadron (9) and the Twelfth Air Force staff (17).

17. Col James Crigger, director of operations, Ninth Air Force, interview with author during visit to Shaw AFB, S.C., 12-13 March 1992.

18. Lt Col J. W. Pfeiffer, director of operations, 507th Air Command and Control Squadron (formerly chief of current operations), interview with author during visit to Shaw AFB, S.C., 13 March 1992; Col Al Doman, Ninth Air Force/DOO (AOC director of combat operations during Operations Desert Shield/Desert Storm), interview with author during visit to Shaw AFB, S.C., 12 March 1992; Crigger interview.

19. Crigger interview; Doman interview.

20. Doman interview.

21. Ibid.

22. Ibid.

23. Ibid.

24. Army Aviation Center "Hot Wash," "Army Airspace Command and Control during Operations Desert Shield and Desert Storm" (hereafter referred to as "Army Airspace C^2"), July 1991, 4-5.

25. Doman interview.

26. Crigger interview.

27. Pfeiffer interview. Colonel Pfeiffer characterized this as the "Oh, shit!" function. Frequently, the first clue to a crisis is when the duty officer involved mutters "Oh, shit!" after receiving bad news (e.g., a scheduled tanker just ground aborted). The alert supervisor immediately begins to move to support even if he or she does not yet know what's wrong. You cannot do this in separate rooms.

28. Crigger interview; Doman interview; Pfeiffer interview.

29. Crigger interview; speaker at the Air War College (AWC), Maxwell AFB, Ala., 23 January 1992.

30. Col James E. Brechwald and Lt Col James M. Young, "F-111 Operations in Desert Shield and Desert Storm," lecture, AWC, Maxwell AFB, Ala., 7 January 1992; Lt Col Bruce A. Wright, "F-16 Operations in Desert Shield and Desert Storm," lecture, AWC, Maxwell AFB, Ala., 26 March 1992.

31. Doman interview; Pfeiffer interview.

32. Lt Col Skip Duncan and Capt Phil Young, Ninth Air Force/DOY, interview with author during visit to Shaw AFB, S.C., 13 March 1992; Crigger interview; Doman interview.

33. "Army Airspace C^2," 2. See also "Army Aviation Lessons Learned," report, AWC, Maxwell AFB, Ala., undated, 83.

34. Crigger interview; Doman interview.

35. Ibid.

36. Ibid.

37. Brechwald and Young lecture; Wright lecture.

38. Doman interview.

39. Brechwald and Young lecture; Wright lecture.

40. Crigger interview; Doman interview; Pfeiffer interview.

41. Duncan and Young interview; Pfeiffer interview.

42. Crigger interview; Doman interview; Duncan and Young interview.

43. Crigger interview; Doman interview; Pfeiffer interview.

44. Histories, 507th Tactical Air Control Wing (TAIRCW) (U), October-December 1980, 47-49; January-March 1982, 57-62; April-June 1982, 56; January-June 1983, 57-59

January June 1984, 25 26; July December 1984, 19 22; July December 1988. (Secret) Information extracted is unclassified.

45. Histories, 507th TAIRCW (U), April June 1980, 38 39; April June 1981, 38 39; January December 1985, 127 32; January June 1987, 39 42. (Secret) Information extracted is unclassified

46. Histories, 507th TAIRCW (U), July December 1983, 49 51; January December 1985, 132 40; July December 1987, 57 63. (Secret) Information extracted is unclassified.

47. Histories, 507th TAIRCW (U), April June 1980, 35 37 January March 1980, 31 33; October December 1982, 49 51; January March 1981, 39 41; April June 1981, 40 42, July September 1981, 33 37; January December 1985, 81 90, 97; January December 1986, 63 64; July December 1987, 43, 75 104; January June 1989, 60 67; April June 1982, 58 61; July December 1983, 58 60; January June 1988, 31 32. (Secret) Information extracted is unclassified.

48. Histories, 507th TAIRCW (U), April June 1980, 40; April June 1981, 42; July September 1981, 40; October December 1981, 56; January December 1985, 124 25. (Secret) Information extracted is unclassified.

49. Histories, 602d TAIRCW (U), January March 1980, 140 43; October 1980 March 1981, 72 73; January March 1982, 16 19; April September 1982, 27; October December 1981, 23 25; October 1983 March 1984, 97, 110 12; October December 1985, 99 112. (Secret) Information extracted is unclassified.

50 Histories, 602d TAIRCW (U), July September 1981, 50; January March 1982, 20 April September 1982, 27 28; October 1982 March 1983, 67 71, 74 76; April September 1984, 63 67; October 1984 March 1985, 78; April September 1986 101; July December 1987, 75 77; April June 1981, 29; April September 1985, 111 16; April June 1980, 58; October 1980 March 1981, 70. (Secret) Information extracted is unclassified.

51. Histories, 602d TAIRCW (U), October 1984 March 1985, 79 86; January March 1986, 99 119; January June 1987, 92 104 (Secret) Information extracted is unclassified.

52 Histories, 602d TAIRCW (U), April June 1980, 58-59; April June 1981, 37 38; July September 1981, 54 55; October December 1981, 26 27; April September 1982, 28; April September 1983, 92 93; October 1983 March 1984, 96; April September 1984, 63; October December 1985 97 October December 1986, appendix 10; July December 1987, 122 23. (Secret) Information extracted is unclassified.

Chapter 4

Conclusions and Recommendations

The examination in chapter 3 leads to two conclusions. First, the basic functions required of the AFCC, particularly when the AFCC acts as the JFACC, exist independent of the size of the contingency. In Operation Just Cause, the AFCC was faced with the problems of coordinating airspace, air defense, and support operations, even though the number of USAF assets committed to the contingency was very low. In Operations Desert Shield and Desert Storm, the scope of operations and number of participants put a premium on the coordination functions involved in planning and tasking, directing and monitoring, and communicating with a diverse force to ensure achievement of a cohesive goal.

The second conclusion follows from the first. If these functions are essential to the successful conduct of operations, then some organization like the air operations center is critical to the conduct of these operations. Certainly the key role played by the CENTCOM's command and control system was recognized by those in command. Gen Norman Schwarzkopf, in testimony before the Senate Armed Services Committee, stated that among the other advantages held by the coalition forces, "our superiority in . . . command, control, communications, and computers . . . proved to be a decisive force multiplier."[1] The Army's new AirLand Operations doctrine, endorsed by Headquarters TAC as a basis for future development of operational doctrine, emphasizes the need for the early establishment of an operational headquarters to improve planning. This requirement is considered so critical that it is characterized as an "enabling concept" for the new doctrine.[2] Therefore, the following discussion focuses not on the need for the AOC, but rather on its form and function in the conditions that will face us in the future.

Administrative Organization of the Air Operations Center

Based on the exercise and operational experience of the AOCs associated with the two TAC numbered air forces, I recommend a closer relationship between the NAF staff and its supporting operational headquarters, the AOC, on a day-to-day basis. The ideal would be to combine the two staffs and to use the same equipment and procedures in peacetime as in wartime. This conclusion was reached independently by the TAC staff, and a major reorganiza-

tion has taken place that will combine these previously separate organizations. As a result of the experiences of Operations Desert Shield and Storm and of previously programmed improvements, a number of changes to the numbered air force, air control wing, and the air operations center are already under way. I summarize these changes here although I hasten to add that the functions and functional organization of the AOC will not change.

NAF/ACW Reorganization

The essence of this reorganization is to continue both the reduction in the size of the NAF headquarters and to refocus it on operational, as opposed to support, functions; to eliminate unnecessary intermediate headquarters; and to organize the same way during peacetime and wartime. Figure 16 shows the proposed NAF and AOC reorganization.[3]

First, the reorganization reduces the size of the NAF headquarters and the scope of its functions. It also focuses on operational and war-fighting tasks. Compared to the organization shown in figure 1, the reader can see that the support functions performed by the comptroller, civil engineer, and others have been removed. These functions will go to the host base where the NAF is located. Although not as apparent, the NAF versus NAFCOS staff distinction, which I previously suggested was relatively meaningless, has been eliminated.

Second, the reorganization eliminates the ACW. As stated earlier, the ACW served only a peacetime administrative and control function. In wartime or contingencies, the AOC and subordinate elements of the TACS fell directly under the AFCH. ACW staff personnel then augmented the various elements of the TACS or the AFCH. The reorganization places the AOC directly under the numbered Air Force commander in both peacetime and wartime, eliminating the need to change organizations in a crisis. The subordinate elements of the TACS that had also been assigned to the ACW will be reassigned to their host wings, but will be tasked in peacetime by the AOC and in wartime will come fully under the AOC.

The AOC itself will undergo a significant administrative organizational change, but its functions will remain intact. Combat operations and combat plans remain the two principal operational divisions. The air intelligence squadron (AIS) is subordinate to the AOC, so the AOC now owns its intelligence staff. All communication and support functions that existed separately in the air control center squadron and AIS are combined and aligned in a communications squadron and logistics squadron under the AOC. Functionally, the AOC will operate as before, except that it is now an integrated organization in both peacetime and wartime.

Figure 17 shows the wartime structure. The key to the reorganization is the lack of major change between the peacetime and wartime structures. The
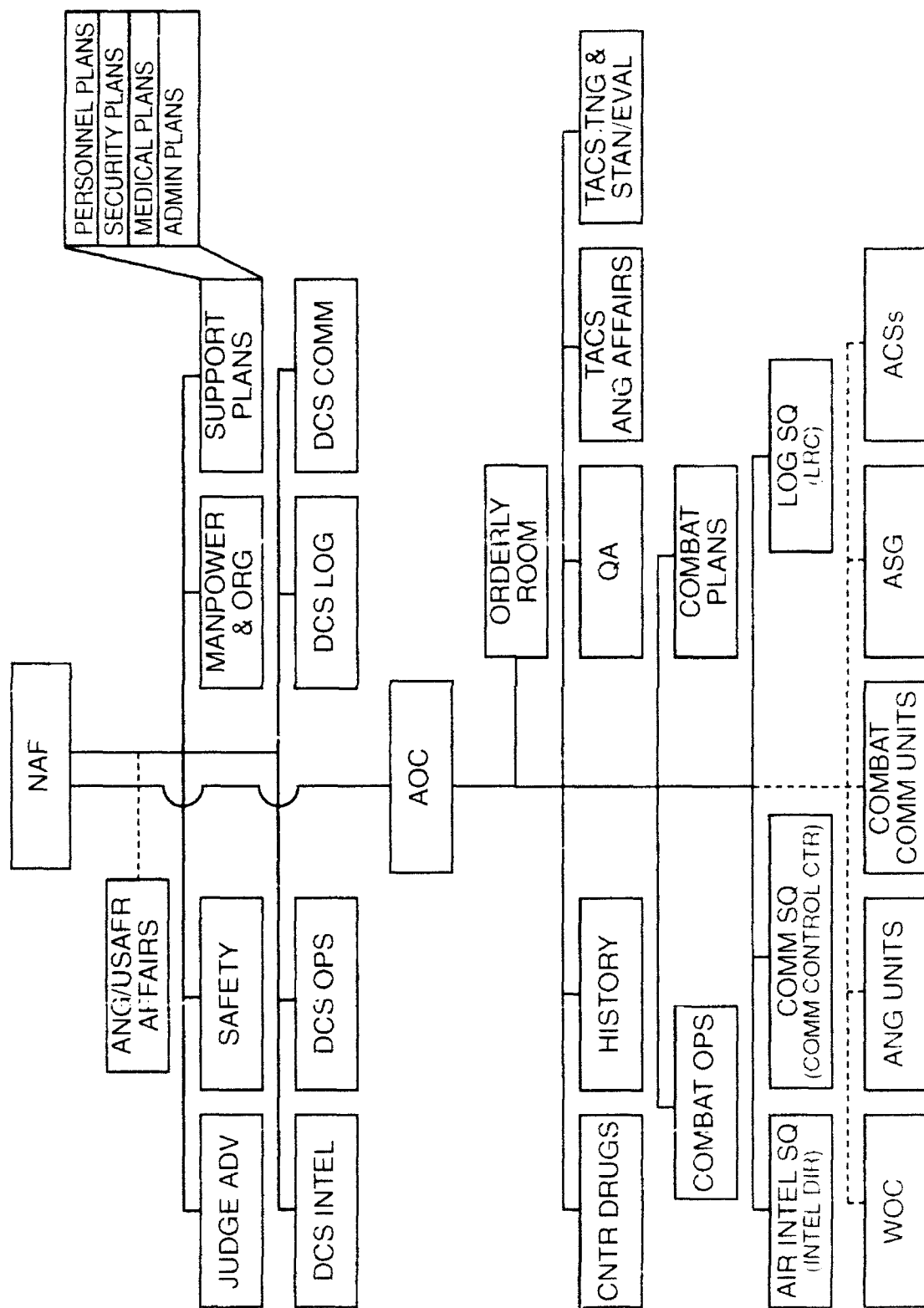
Figure 16. Air Operations Center—Peacetime

Source: Adapted from HQ TAC Deputy Chief of Staff for Plans briefing

Chart labels:

PERSONNEL PLANS
SECURITY PLANS
MEDICAL PLANS
ADMIN PLANS

SUPPORT PLANS
MANPOWER & ORG
NAF
ANG/USAFR AFFAIRS
JUDGE ADV
SAFETY
DCS COMM
DCS LOG
DCS OPS
DCS INTEL

AOC
ORDERLY ROOM
TACS TNG & STAN/EVAL
TACS ANG AFFAIRS
QA
COMBAT PLANS
LOG SQ (LRC)
ACSs
ASG
COMBAT COMM UNITS
ANG UNITS
WOC
COMM SQ (COMM CONTROL CTR)
AIR INTEL SQ (INTEL DIR)
COMBAT OPS
HISTORY
CNTR DRUGS
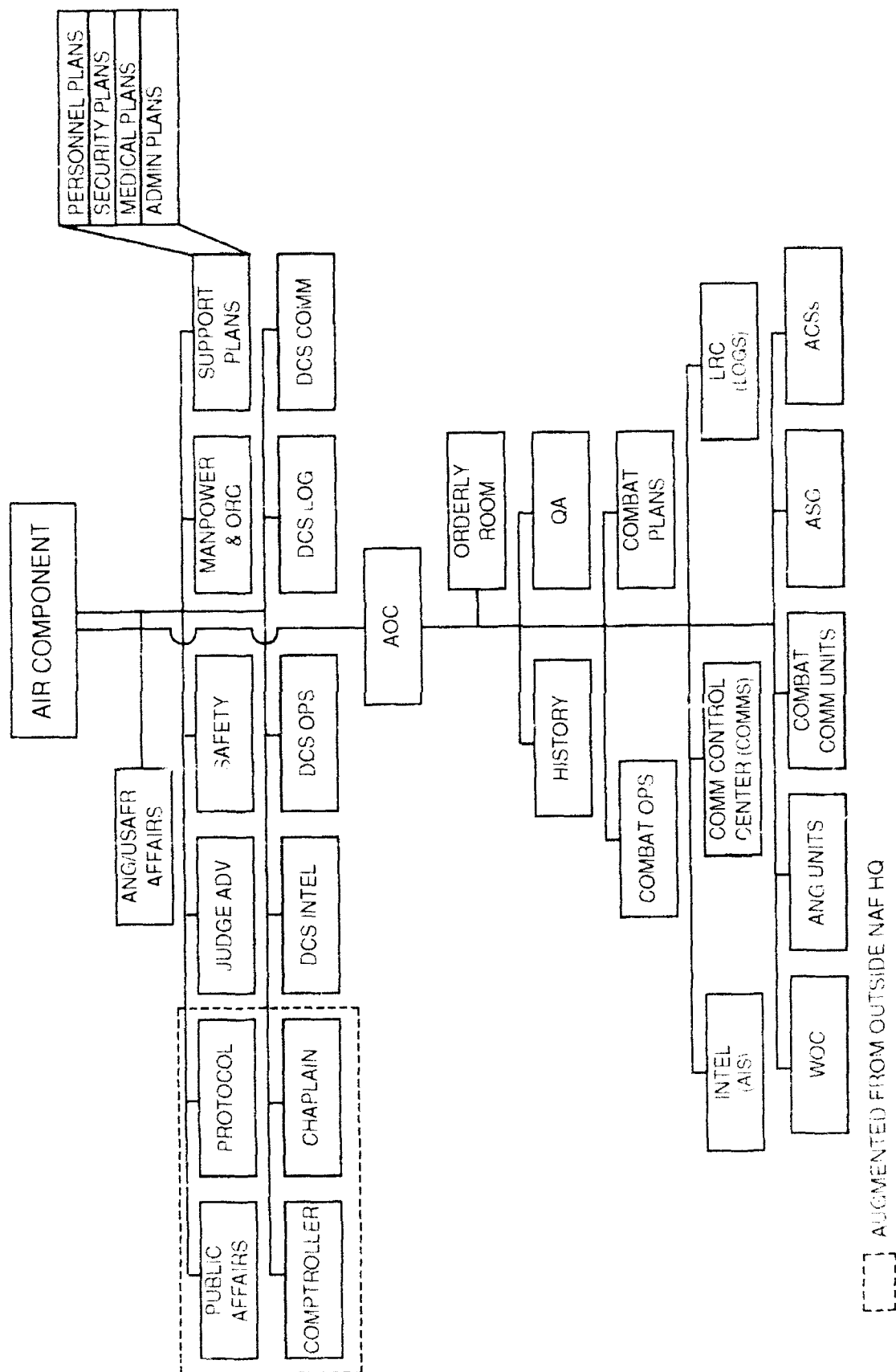
Figure 17. Air Operations Center—Wartime

Source: Adapted from HQ TAC Deputy Chief of Staff for Plans briefing

[ ] AUGMENTED FROM OUTSIDE NAF HQ

reorganization has not eliminated the need for augmentation manning in the fully operational AOC.

Modular AOC

The modular AOC program is an effort to replace both the mobile shelters and the data-support equipment of the AOC with new designs. The most significant part of the change is the use of a distributed, multicomputer network with smart workstations to aid both the operations and intelligence functions of the AOC. The program also replaces the inflatable shelters used previously with a hard-wall mobile shelter.

The new workstations will be multifunctional, allowing access to all the planning aids resident in the supporting computers, to the information data base, and to the air picture. Included in the program are remote workstations that can be moved by any long-haul tactical communications medium, giving such users as the wing operations centers access not only to the ATO but also ultimately to many of the data bases. The basis for the system is the Contingency TACS Advanced Planning System (CTAPS). Intelligence information will be provided via the Intra-theater Imagery Transmission System (IITS), Senior Troupe, and the TEP.[4]

The workstations will accommodate a number of planning aids to assist in the development of the ATO. These include CAFMS; Airspace Deconfliction System (ADS), to develop the airspace control order (ACO); the BCE Automated Support System (BASS), to provide air support tasking information to the Army; and message handling routines capable of creating and receiving standard message traffic.[5] The automated planning aids will speed preparation and handling of the ATO, while the remote workstations will break the tie between the AOC and its tactical shelters, allowing fuller use of the equipment in peacetime and wartime.

These initiatives will allow the NAF staff more interaction with the AOC staff on a day-to-day basis, since the AOC staff and its associated units are now directly responsible to the NAF commander. This interaction should foster the confidence that comes with knowing the person you operate with and make it less likely that AOC personnel will be excluded in a crisis. Moreover, the ability to remote the workstations will permit both NAF and AOC personnel to employ their equipment on a daily basis. These stations, taken together with compatible stations employed at the wing level, afford the opportunity for all echelons to operate in peacetime as they do in wartime, eliminating the transition that would otherwise occur in a contingency. The Ninth Air Force director of operations stated that he intends to place several of the AOC modules adjacent to the headquarters building and to put workstations in the headquarters. He suggested that some aspects of the daily peacetime flying schedule would be handled via the AOC system to ensure operator familiarity at all levels.[6]

Operations in the Air Operations Center

In general, the functional organization of the air operations center seems to be appropriate. In an operation of the magnitude of Operations Desert Shield and Desert Storm, the need for all the functional positions and the advantage of the split between the planning and operations functions are apparent. Even in a lesser contingency such as Operation Just Cause, the benefits of providing for liaisons, a planning cell, and an operations cell became apparent to the members of the AOC as the operation progressed. The issue seems to be less with the functional structure of the AOC than with the way we provide for that structure.

Size and Scope of Effort

Participants in both operations observed that the size of the effort exceeded what they had anticipated. Further, the size and complexity of operation translated into a recognition of a desirable physical arrangement for the conduct of the various functions. Best exemplified by the arrangement in Operations Desert Shield and Desert Storm, real benefit was seen in putting the operations functions in one room to facilitate the rapid exchange of information. Similarly, the planners benefited from being located in one facility.

The old AOC shelters were designed with this in mind, having one large floor space each for the combat plans and combat operations functions. The concept of the new shelters is based on separated modules linked by a computer network. Ninth Air Force tested this configuration in one of their Blue Shield exercises by constructing plywood walls in the exercise facility. The result was extreme frustration among the planners and operators; functions were noticeably improved when holes were cut among the plywood walls to allow direct coordination.[7] Although reliance on the shelters in their separated configuration may be required in some scenarios, the commander should seek either to join the shelters or to find a usable open facility where workstations can be remoted to ensure best operation.

This assessment also suggests the need to evaluate an AOC deployment configuration in which only the computers and workstations need be deployed, while the shelters remain at home station. Given that the shelters and their associated environmental units require at least a C-141 airlift, the result of this configuration option may be a more responsive, less lift-intensive AOC element. A less lift-intensive element is more likely to be employed in a contingency, increasing the capability of the air force component commander or joint force component commander to control forces.

Augmentation and Liaisons

The experiences examined in Operation Just Cause and in Operations Desert Shield and Desert Storm reinforce the need for, and the importance of, augmentation and liaison. For the purposes of this discussion, augmentation

personnel are those USAF personnel from within the tasked major command required to make the Air Force component headquarters and the air operations center fully operational. Liaison officers are personnel from other major commands, other services, or other nations required to effect coordination with the AFCH (and its AOC).

Augmentation. Neither the old AOC organization nor the new organization has the full complement of personnel required to man all positions in a major regional contingency. To preclude the kinds of problems imposed by training new personnel in a crisis, I recommend a conscientious effort to identify and periodically exercise augmentees to the AOC for contingencies. Precrisis identification of augmentees has three benefits. First, and most obviously, it allows the augmentee to be trained to perform the duties required of the position. Second, it allows the NAF commander to evaluate the performance of the augmentee before putting that performance to test in a crisis. Finally, it allows the augmentee to be prepared in advance for deployment. This is an essential requirement if the augmentee occupies a position that would not otherwise require maintenance of such predeployment preparations as shots, weapons training, and the requisite equipment for deployment.

Augmentees should be identified both for filling such key positions as director of combat plans or director of combat operations and for the unit/aircraft assistance positions, the duty officers. Identification, preparation, and evaluation of augmentees are most important in regard to the former type of positions. Depending on the scope of the contingency, these key positions are likely to be filled by colonels and, in the event of a major contingency, may be filled by general officers. The AFCC will have to rely on these personnel for key planning and mission execution functions, so they must be a "known quantity," that is, people the AFCC knows and trusts. Repeated exposure to exercises and operations can best establish this relationship. Diverting key colonels or general officers from peacetime duties to contingency operations also will affect the units they are taken from, a further argument for preidentification of the augmentees.

The requirement for duty officers to be identified by name and position is less essential. However, the requirement to provide these augmentees to the AOC should not pose a surprise to units. They should maintain a pool of personnel, identified by name at the wing level, who are trained by the AOC and can be tasked should the situation warrant. Under this program, the NAF and AOC will only levy a requirement for the number of augmentees to the wing. The wing will schedule training, track personnel availability, and provide augmentees when tasked.

Liaison. Future operations in the changed world order will be joint and frequently will involve participation of other countries.[3] The participants in Operations Just Cause, Desert Shield, and Desert Storm all stressed the value of and necessity for liaison elements. This lesson has even been incorporated into US joint doctrine in Joint Publication 1, *Joint Warfare of the US Armed Forces*, which states, "ample and effective liaison parties and teams

served to keep communications constant and effective [in Operations Desert Shield and Storm]."[9] The need for liaison imposes several requirements on the AOC.

First, the AOC must provide for the various liaison elements in terms of both space and supporting equipment. Anticipated liaison support requirements should be planned for Army (BCE), Marine Corps and Navy (NALE), airlift forces, special operations, space command, and national assets. Precoordination and exercise are essential. Such coordination helps to establish trust and a rhythm of operation among participants. Moreover, the exercise of these functions would help identify unique support requirements that may not be covered in the standard communications and equipment of the AOC. Early identification would allow the liaison elements to bring such equipment with them and would allow the AOC to plan for its integration.

Second, liaison elements must be aligned in the same organizational structure as the joint command; that is, if the components are organized by service, as they were in Operations Desert Shield and Desert Storm, liaison elements should be similarly aligned. One would then expect the BCE to represent Army forces (ARFOR), the Marine Corps element to represent Marine forces (MARFOR), and the Navy liaison to represent the naval forces (NAVFOR). If the components are functionally aligned, the liaison elements would be reconfigured. The BCE would be a joint organization representing the Army and Marine Corps forces assigned to the land component commander, and the NALE would represent the naval component commander (NCC). In either case, the particular liaison element "must" represent all forces assigned to its component, and it must know it does so. That is, each Army corps headquarters may maintain a group of people trained to perform as a BCE and more than one corps may be assigned to one Army commander, but there must be only one BCE to represent all the corps at the AOC. The Army appears to recognize the need to reevaluate the importance of adequately manning the headquarters echelon above the corps to coordinate the activities of Army units.[10] The Marine Corps generally provides one headquarters for its forces, and the Navy needs to have a single focal point for its forces, even if there are multiple battle groups.

The requirement for interservice coordination and liaison affects the USAF as well. We have institutionalized our liaison with the Army through the air support operations center and the air liaison officers assigned with corps, divisions, brigades, and battalions. If the Army forms a headquarters above the corps level, we must be able to provide liaison to that element. Further, we do not provide in advance for liaison elements to Navy and Marine Corps elements, but must train and provide them in the future. These personnel might be selected members of the NAF and AOC staffs, having planning experience and knowledge of the AFCC's concept of operations so that they could adequately and accurately represent the commander. Such personnel have the added advantage of being known to the AFCC. Loss of these personnel could be offset by augmentees to the AOC and NAF.

Communications

Successful operation of the AOC, especially if the AFCC is acting as the JFACC, depends on the ability to communicate between the services. The services have invested over the years in making their communication systems compatible. They have even agreed to data link standards for passing air picture information among the participants in the air defense system. However, there has been no agreement on a format and means to transmit air taskings. The air tasking order used in Operations Desert Shield and Desert Storm represented a USAF standard way of doing business. Doing business this way resulted in difficulties in passing the ATO to Navy units afloat and to Army units below corps level.[11]

Since the experience in those operations, a number of initiatives have already been taken to resolve this problem. First, within the USAF there is now agreement on a standard means to develop and transmit the ATO. The agreed standard is CAFMS, with growth to CTAPS.[12] Second, the Air Force and the Navy are working a series of equipment installations and training exercises using CAFMS equipment. At least five Navy ships now have CAFMS equipment installed and are training on a monthly basis with USAF units. The Navy is planning to grow to CTAPS along with the USAF.[13] Army airspace users, including aviation and artillery units, must likewise acquire and integrate CAFMS compatible terminals. Although some Army aviation and artillery elements are not tasked by the ATO, the ATO instructions also contain the airspace control order (information crucial to safe flight operations). Finally, the joint staff has recognized the need for a standard tasking protocol and has agreed to use CTAPS as the standard for development. The staff has tasked the USAF to accommodate Army and Marine Corps requirements in its development of the system.[14] These efforts suggest that use of the ATO will be a cornerstone of future operations.

The Air Tasking Order

The discussion above suggests consensus on the utility of the air tasking order. Operation Desert Storm commanders from all services have commented on the value of the ATO and have suggested it is the way future operations will be coordinated.[15] Agreement that the ATO was useful does not mean that there is agreement on the content of the ATO nor on the way in which it is put together. Even before Operations Desert Shield and Desert Storm some suggested that the ATO was not the most effective means of tasking.

The Air Tasking Order and Mission Orders

General McPeak, the USAF chief of staff, is a particular critic of the ATO He describes the ATO as a detailed document, running 50 or more pages,

specifying targets, time over targets, routes, radio procedures, and even such details as fuzes for ordnance. Such details require a long planning cycle, long transmission times, and target information that frequently can be out of date before it reaches the tasked unit. Further, the centralized nature of this effort requires busy communications, not only from the headquarters to tasked units but also from the units to the headquarters in providing status information so the planners at the AFCH and AOC can plan and task adequately.[16]

To solve such problems, General McPeak suggests that the Air Force should provide "mission-type" orders to wing commanders. These orders would specify the target and the time window in which it should be attacked. If a commander was unable to undertake the mission or needed support, coordination with higher headquarters would be necessary. In addition to reducing the size of the ATO, the communication system would be less burdened since the requirement to report status information up channel would be reduced.[17] The draft AFM 2-1, "Theater Aerospace Warfare," qualifies the general's suggestion slightly, stating that mission orders can be used for "units *collocated* with each other which have *established coordination procedures* for mission planning [emphasis added]." The draft AFM 2-1 defines mission orders in much the same way General McPeak does.[18] (To be fair, General McPeak's comment should probably be taken in the context of consolidated units since his article speaks to the advantages of the composite wing.) Would the use of mission orders really reduce the bulk of the ATO? I think not since certain requirements will remain, especially if the AFCC is acting as the JFACC and even if the AFCC's is more constrained.

The first problem is to define what constitutes a mission order. According to US Army FM 100-5, *Operations*, missions orders tell the commander what must be done without limiting how it is done. However, the manual goes on to state that to allow such freedom, certain techniques and practices must be used, including warning orders to allow time to prepare (anticipatory planning) and prepositioning units. The bottom line for success in the Army is whether or not the US command system is faster and more effective than the enemy's.[19] An examination of the Army's five-part operations order suggests the content of a mission order and what minimum kinds of information must be included. The Army format states that coordinating instructions must be included if two or more subordinate units are affected and that command and signal information (including frequencies, call signs and identification information) should be included.[20] I would suggest then, that even mission orders should include coordinating and command and signal information. How does this requirement affect interpretation of what the ATO is and should be?

First, the ATO will always be a relatively bulky document, even if only a single composite wing is deployed. Unless the USAF is deployed alone, the deployment of other service or host-nation forces will immediately force the production, transmission, and update of an airspace control order, the coordinating and identification information needed to deconflict operations. Note that this requirement will exist even if the other service or nation has only surface-based forces since the coordination of friendly fire in the airspace is a

factor to be considered. If other flying units are added to the problem (USAF or other service or nation), the problem is immediately compounded since targeting, tasking, and routing deconfliction must be added to the ATO. The USAF must admit that all units, especially the composite wings, need to produce and use an ATO of some complexity. In fact, if the USAF is to make effective claim to being the principal agency responsible for performing the JFACC role based on its ability to fulfill the role, effective and efficient use of a vehicle like the ATO is central to that claim.

Second, even if the Air Force were to decentralize planning in its entirety, that would not necessarily reduce the communications burden imposed on the command and control system. In fact, such decentralization might make the system more vulnerable. If each commander must identify shortfalls, coordinate with adjacent elements, and work problems laterally, the communications burden is more significant than if all communication is handled from the center out. When the Navy could not receive the ATO in Operations Desert Shield and Desert Storm, it was flown to the carriers (one way). If a decentralized system means more two-way coordination to achieve the same end, alternatives such as a courier backup will be unworkable. Regardless of the approach, we must recognize that the effective coordination of air power, with its ability to traverse large distances in short times, will of necessity require a robust and rapid communication system to exercise effective command and control in response to changing battlefield situations. Even the Army, with its relatively smaller area of influence and longer response times, states the need for command and control systems to do the preplanning and coordination necessary to make mission orders effective. We must invest in the communications required to make our wider-ranging and faster capability effective.

In summary, the ATO does represent the mission-type orders that are now being advocated by the USAF. If the USAF is to exercise control of its own forces and, more importantly, if USAF personnel are to be prepared to act as the JFACC, we must use and master this means of transmitting orders. However, to advocate the ATO as the means needed is not to suggest that changes cannot be made.

Modifying the Air Tasking Order

To modify the ATO, the AFCH and the AOC must carefully review what information necessarily must be developed at the AOC level, and which can be more effectively developed at the unit level. The Air Force also needs to review the planning process that precedes development and publication of the ATO. Finally, the Air Force needs to develop a means to respond to changes in target information.

Limiting the Content of the ATO. The easiest change to make, and the one most amenable to the lessons learned from Operations Desert Shield and Desert Storm, is to review the content of the ATO for information it must can develop on its own. Two items come to the top of the list based on unit

comments from Operations Desert Shield and Desert Storm. One, selection of the appropriate weapon for a target, unless it is a one-of-a-kind target, should be delegated to the unit. The AOC staff should be familiar enough with assigned units to know which to select for certain missions and targets. Weapons effectiveness data is available at unit level and can be used by weaponeers and operators at that level to select ordnance. Thus, the amount of time spent weaponeering the target at the AOC can be cut out of the cycle, reducing part of what was a 12-hour targeting cycle. Leaving the ordnance selection at unit level also means that the AOC does not need as detailed or time-sensitive data on ordnance availability at the units, placing the tracking and requesting burden on the unit and reducing the communication required between the unit and higher headquarters.

Two, route planning from the departure from friendly airspace to the target, including selection of initial points, should be left to the tasked unit. Again, information should be available at the unit, closer to the time of mission execution, to allow the mission commander to more accurately select routes to avoid threats and to provide the best approach to target. The unit must be given routing restrictions in friendly airspace and key rendezvous points and times, such as refueling tracks and times.

Both these procedures were implemented by the AOC staff as operations progressed in Operations Desert Shield and Desert Storm. The response from unit commanders was that these changes were appropriate and useful, and that they were quite capable of providing needed information at their own level.

Apportionment and Allocation. As indicated in the assessment of Operations Desert Shield and Desert Storm in chapter 3, the concept of apportionment and allocation was relatively meaningless in practice. The focus of planning was on the conduct of air operations in support of a theater campaign plan. This focus is appropriate, and I recommend the entire concept of apportionment and allocation be dropped from USAF doctrine. Instead, the AFCC (whether acting as the JFACC or simply as a component commander) should develop a set of ranked objectives for the planning day that air (or USAF) forces should accomplish. The AFCC must develop this concept in conjunction with the other component commanders and then present the concept and priorities to the joint force commander for approval. Once the concept and priorities have been approved, planners use available assets to meet the priorities specified.

This revised process offers several advantages. First, it eliminates the focus, if indeed there ever was one, on the need to develop a weight of effort and then a concept of operations based on that weight. Instead, the campaign concept takes rightful primacy in consideration. Second, it eliminates a source of quibbling among services (i.e., support was inadequate because an arbitrary level of effort was not reached). The focus is on the results of the campaign, and the basis for discussion among the services is now put on similar footing regardless of branch. For example, the Army does not discuss

commitment of forces in terms of a percentage of assets allocated to a screening mission but rather on the need to establish a screen against an estimated threat for a specified period of time. It then leaves planning to the involved commander. USAF planning should take place on similar terms with results achieved being the measure of merit.

Timeliness of Planning versus Timely Targets. General McPeak, in his article on the composite wing, expressed concern that the length of the planning cycle, which he said was 72 hours, was excessive.[21] This planning time line did not appear to be a major constraint in Operations Desert Shield and Desert Storm. Perhaps as the Army suggests, the measure of effectiveness is not an absolute time line, but whether the system allows the AFCC or JFACC to be faster and more effective than the enemy. In this regard, it may be useful to distinguish between planning and execution and focus on improving the latter.

Effective planning depends on getting ahead of the enemy and implementing a concept of operations to force the enemy to respond rather than to respond to the enemy. To develop the concept, the commander must look ahead to the objective and develop a phased course of action to reach that end.[22] All of this implies looking ahead for the duration of the campaign, whether the duration be hours, days, or weeks. Immediately then, the nature of planning is to be some period of time in advance of execution.

The amount of time required in advance of execution to prepare a plan is governed by three other factors. First is the time it takes to convey the plan to the tasked elements and to allow them to plan. Based on recent experiences, the tasked units need at least 12 hours. Second, the higher level planners themselves need a finite amount of time to create the plan. Based on recent experience, they may take as much as an additional 24 hours. Finally, the time needed before execution also is governed by the reaction speed of the other elements involved in the plan. If these elements include ground or naval forces, lead time could be days or weeks. Therefore, focusing on the time line of the ATO planning cycle as the cause for lack of responsiveness may be inappropriate. Instead, the issue should be how can the information in the ATO be made flexible enough to allow air forces to respond to changes in the battlefield situation without totally disrupting the plan.

The answer is only in part to modify the ATO. Targets that are likely to move, such as battlefield targets, can be identified by type but specific coordinates withheld until execution of the mission. CENTAF addressed this problem through the development of "kill boxes" to designate the area into which the mission would be tasked. Such designation allows basic mission planning (e.g., ordnance selection and route planning) to take place, but clearly signals the aircrew that the target is moving. Mission information must then be updated either before departure, or while in the air through forward air controllers or some other command and control agency such as joint surveillance target attack radar system (J-STARS).[23] Thus, the planner can easily modify the plan to allow flexibility, and the real burden goes to the execution side of the AOC.

The first area for improvement in execution is to improve the tie between the AOC combat operations section and the agency that will provide forward control for attack packages. Traditionally, this connection is done through the air support operations center or the ABCCC. Two new platforms are also possible candidates, the E-3A and J-STARS. Of these candidates, the most promising are the ABCCC (or a follow-on) and the J-STARS since the E-3A is generally tasked with the control of airspace, deep attack, and air defense operations. Improvements here need to focus first on reliable secure voice communications to allow basic divert information to be passed. Expanded capabilities should include provision of CTAPS terminals and possible transmission of J-STARS information back to the AOC.

The second area for improving execution capability is to improve the rapid receipt and distribution of intelligence and targeting information from national and tactical sensors to the AOC, to the execution forward elements, and to the units themselves. Since the existing capability allows dissemination of such information on broadcast nets, there is no reason to limit the number of receivers. If all elements are operating from a common data base, the final designation of the target becomes a simple matter. The key is to focus on improved execution capability, not shortened planning cycles, to improve the ability of the system to respond to changes in the battlefield.

Exercises

Gen Robert D. Russ, a former TAC commander, wrote in an article about the new modular tactical air control center (MTACC) program that the reason previous attempts to improve the AOC had failed was "due in part, to inadequate *user* involvement [emphasis added]."[24] I suggest that the reason many commanders are uncomfortable with the air command and control system is that they (the users) are not adequately involved with it. Certainly, those staffs who are, such as the Ninth Air Force staff, have fewer concerns about the system overall and in the past were able to make it work. The only way to both gain confidence in the system and to accurately identify shortfalls is to use and exercise the system on a routine basis. Such exercises must involve the senior commanders, must use the equipment that will really be available, and must use live flying where possible. Fortunately, improvements in tactical communication technology will allow more exercise of the system without increases in cost.

Participation by Senior Officers

Units take more interest in their performance in an exercise when senior commanders participate than when exercise direction is delegated to subordinates. Our air control wing did better in system training exercises when the wing commander and all unit commanders participated than when the senior staff delegated the running of the exercise to a subordinate unit, and that

unit's commander, in turn, did not participate but delegated action to a subordinate. Debriefing and solving problems in an exercise was easier when key personnel participated and experienced the difficulties themselves. Of equal importance, senior commanders can save themselves from many unpleasant surprises by discovering that capabilities they thought they had were not exactly as advertised.

The tie of the air control system directly to the NAF in both peacetime and wartime means that the NAF commander must participate directly in some of the exercises to determine if the commander, as the user, is in fact satisfied with the way the system works. The removal of the air control wing from the traditional USAF force structure eliminates the single advocate for command and control systems, forcing commanders to be their own advocates. The NAF reorganization will assist the NAF commander to become involved by removing some of the day-to-day responsibilities that demanded the commander's attention. The new focus is on war fighting, and the NAF commander (and subordinate wing commanders) should have the time to actually use the system and to demand changes when it falls short.

Use of Actual Equipment

There is no substitute for using actual capabilities in an exercise to get an accurate appraisal of the advantages and limitations one might experience in a deployed setting. To be effective, the exercise program must rely on actual equipment and capabilities to the maximum extent feasible. In the past, lack of appropriate equipment at the unit level and the need to deploy extensive relay systems to provide a tactical communication network (or alternately to deploy units to locations where they could employ their equipment) all added up to additional expense and time required for a realistic exercise. The development of the wing communications package and fielding of tactical satellite communications (SATCOM) systems will make it possible to exercise the whole system from home bases with no additional expense.

As a result of the experience in Operations Desert Shield and Desert Storm, TAC is developing a wing communications package to provide the wing commander with organic communication systems capable of supporting all initial operations. In addition to intrabase communication equipment, this package will include a message terminal, a terminal for the ATO, and both SATCO, and HF communication systems.[25] Given that the AOC already has similar communication capability and that the AOC's terminals can be remoted into the NAF headquarters, all it will take to arrange an exercise network will be to coordinate satellite time and HF frequencies. All units will be able to participate from home station. Such exercises are critical to maintaining the communicators' skills in using the equipment and will serve to keep the NAF and wing commanders and their staffs familiar with the uses, capabilities, and limitations of their packages.

Live Flying Exercises

Such command post exercises (CPX) as Blue Flag and exercises at various war-gaming centers are adequate for developing intrastaff coordination but fall short in two critical areas. First, as I have already mentioned, they do not give the commander a feel for the real capabilities and limitations of the supporting communication system. Second, intelligence play is usually artificial, and although the supplied intelligence may be constrained by the exercise control team, it may be more reliable and timely than the real system can provide. To provide real feedback, exercises must involve flying. Fortunately, the same communication advantages that allow the NAF commanders to establish a network will also make live exercises possible without significant expense.

Numerous live flying exercises already take place in the Air Force training schedule. These include Red Flag, support to the Army at the National Training Center, support to the Marine Corps AW Ground Combat Center at Twentynine Palms, California, various JCS-sponsored exercises, and even some exercises sponsored by the NAFs and their subordinate wings. Establishing the communication network already suggested and arranging for the participation of national systems and various sensor platforms (many of which could fly from their home stations) would allow the NAF commander to use the existing exercise schedule to test new concepts. The effect of such participation on training objectives already established for the exercises must be considered, but the impact could be limited by having higher headquarters control only selected exercises. Higher headquarters involvement in other exercises could be nonintrusive, having only the objective of collecting and disseminating information from the exercise area to higher and participating headquarters.

This objective is critical in light of the many complaints in Operations Desert Shield and Desert Storm regarding the failure to get intelligence information down to the wing level in a timely fashion and to provide adequate BDA. By tasking national or theater collection assets against exercise play and then disseminating the results via the command and control network, the NAF commander can evaluate the capacity of the system without impinging on the exercise. Conversely, if one of the exercise objectives is to teach commanders what BDA they can expect, a whole exercise could be run only on the intelligence actually gathered. This effort would not only sensitize the operational commander to the capabilities and limitations of intelligence support but would also sensitize the intelligence provider to the actual needs of the operational community.

The Composite Wing and Global Reach

The experience of Operation Just Cause suggests that any USAF force deploying in the future, even in response to a limited contingency, must have

some capability to perform AOC-type functions. By extension, the composite wing, which is intended to respond to just such contingencies under the USAF concept of global reach, must have the same capability. The experience of Brig Gen Lee A. Downer, commander of the 7440th Composite Wing (Provisional) during Operations Desert Shield and Desert Storm, confirms this conclusion. General Downer states that he formed his staff by selecting the best officers he could find in Europe.[26] Because of the separation of his wing's area of operations from the rest of the Desert Storm area, he was given less specific mission guidance, allowing him more freedom to plan operations. Yet, the wing produced its own ATO, beginning about 28 hours before mission execution.[27] General Downer also found it necessary to assign "mission monitors" to track both planning and execution to aid mission commanders.[28] Thus, to control the operations of his wing, General Downer created the equivalent of an AOC featuring combat operations and combat plans functions (the mission monitors) and publication of his own ATO.

Use of the Air Tasking Order

Among General Downer's lessons learned were the need to use the ATO on a daily basis in peacetime and become familiar with the format and the need for units to understand the command, control, and communications structure they will operate with.[29] I have discussed these conclusions in some detail earlier in this chapter. How then might we provide this AOC-type capability to a wing in the event that it is tasked in a contingency?

Augmenting the Wing Staff

Lt Col Robert J. Blunden, Jr., in his paper on tailoring the TACS, has suggested some possibilities. He suggests expanding the staff assigned at the wing level, especially for composite wings, to allow the staff to perform the functions. Further, he suggests that the provision of CTAPS terminals to the wings might allow the staffs to do more planning.[30] The latter suggestion has merit, especially in light of the current initiative to provide SATCOM terminals to the wing. These terminals would allow the wing staff to access the AOC data base at the NAF headquarters. However, manning limitations may preclude increasing wing staffs.

Instead, a deploying wing could be augmented by personnel from the NAF and AOC. If only the wing is picked for the contingency, these personnel must be clearly tasked as augmentees to the wing, not as representatives of the NAF. This option has several advantages. It takes advantage of a pool of trained manpower that will exist without imposing additional manpower requirements. It increases the interaction between the NAF/AOC and assigned wings. Finally, if the contingency expands to require deployment of a full NAF-level AOC, some personnel will already be in the theater and familiar with the situation.

The EC-135 and ABCCC Replacement

The recommendation covers only the personnel side of the requirement. Certainly, the new wing communications package will provide some limited planning capability, especially for a single wing operation. However, in a broader contingency, especially involving other services, some larger capability might be required. To cover this problem, I recommend the use of modified EC-135 aircraft to serve as a rapidly deployable AOC. Moreover, several of the participants from Operations Desert Shield and Desert Storm have suggested that the ABCCC was useful but needs upgrades, including air picture displays. Rather than attempt to upgrade the space-limited, C-130 based ABCCC, I suggest the USAF can get better results by switching airframes. As part of force drawdowns, the Air Force is retiring 39 EC-135s that could be used for this purpose.

The EC-135 has 14 duty positions for controllers and has a modular communication suite with SATCOM capability. Although the communications mix would need to be modified for contingency operations, the modular communication racks simplify this process. Further, the duty positions already have multimode, plasma displays that may be able to handle the data formats necessary for air picture and intelligence displays. The speed and range of the EC-135 would allow it to accompany a deploying force making it more compatible with the composite wing and the USAF global reach concept than the C-130.

Operationally, the EC-135 would help address three phases of a contingency. In initial deployment, the EC-135 could accompany the force and operate continuously. It could maintain contact with higher headquarters en route and, once in the theater, could provide an immediately operational command facility either airborne or on the ground.

If the contingency expands and a ground-based AOC is deployed, the EC-135 could fill the airborne, forward direction role the ABCCC provided in Operations Desert Shield and Desert Storm. In this role, the EC-135, modified with air picture and intelligence (perhaps J-STARS) displays, and integrated with other platforms such as the E-3A and the RC-135 would provide a much more robust and capable airborne command element for the theater commander. Use of the EC-135 would also relieve pressure on the crowded E-3A aircraft and would enhance the theater commander's ability to redirect the force in response to changing situations by reducing reaction time in the execution phase of operations. As I suggest earlier in this chapter, reductions in execution response time are more important than reductions in the planning cycle.

Finally, employing the EC-135 as a forward airborne command element would allow the system to act as a fully capable, alternate AOC in the event of loss of the primary system (similar to the role it fills in strategic deterrence

today). In light of the comments from participants in Operation Desert Storm that the ABCCC was useful but needs extensive modification and the fact that the EC-135 aircraft will be freed from their strategic deterrence mission, the USAF should consider integrating them into the contingency force to provide a rapid-reacting AOC capability.

Summary

The USAF needs the air operations center. Even in small contingencies, the functions of the AFCC demand a capability to plan and task, direct and monitor, and communicate with assigned forces—an AOC. If the USAF is operating with other services, especially if the AFCC is serving as the JFACC, the capabilities provided by an AOC organization are essential.

Although the AOC is not fundamentally broken, the system can be improved. I have suggested areas for improvement that may be different than those being worked by the senior staff. In fact, the TAC staff is already well along the path to hardware improvements and administrative restructuring. If we are to exploit the full range of capabilities provided by our air forces, we must acknowledge the need to give senior level attention to the means by which we control air forces.

The system must be used on a regular basis, preferably daily. The augmentees needed to operate the fully deployed system must be identified and trained through regular exercise of the system. The system must be exercised as it will be employed, without the use of fixed, home-base communications to remedy shortfalls.

Involved senior commanders, particularly at the wing and NAF levels, using the system on a routine basis, will be the key to defining and advocating improvements, modifications, and acquisitions. As much as aircraft tactics are improved by the user, the command and control system must evolve to meet its user's requirements. The user, however, is not the command and control specialist, nor the communicator or intelligence officer, the user is the combat commander who cannot wait until the crisis erupts to discover that capabilities are lacking. The peacetime reorganization of the NAF and the elimination of the air control wings, coupled with opportunities provided by improved tactical communications at both the NAF and wing levels, will afford NAF commanders an opportunity to operate, test, and refine "their" command and control system.

Finally, the evolving concept of using US-based contingency forces to respond to global crises requires a command and control structure that can be rapidly deployed. I have suggested several solutions, but the essential message is that these problems must be addressed, not put on the back burner as budget pressures increase and memories of lessons from recent operations fade.

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GLOSSARY

AADC	area air defense commander
ABCCC	airborne battlefield command and control center
ACA	airspace control authority
ACC	air component commander
ACE	airborne command element
ACO	airspace control order
ACS	air control squadron
ACW	air control wing
ADA	air defense artillery
ADP	automatic data processing
ADS	Airspace Deconfliction System
AFB	Air Force base
AFCC	Air Force component commander
AFCH	Air Force component headquarters
AFFOR	Air Force Forces
AFM	Air Force manual
AIS	*air intelligence squadron*
ALCC	airlift control center
ALDO	airlift duty officer
ANG	Air National Guard
AOB	air order of battle
AOC	air operations center
AOR	area of responsibility
ARC	air reserve component
ARCENT	Army Central Command
ARFOR	Army forces
ARLO	air reconnaissance liaison officer
ASC	air surveillance coordinator
ASG	air support group
ATO	air tasking order
AWACS	airborne warning and control system
BASS	BCE Automated Support System
BCE	battlefield coordination element
BDA	bomb damage assessment
C^3OB	command, control, and communications order of battle
CAF	Canadian Air Force
CAFMS	Computer-Assisted Force Management System
CAS	close air support

CC	Compass Call
CCO	chief, combat operations
C-EDO	communications-electronics duty officer
CENTAF	US Air Forces, Central Command
CENTCOM	US Central Command
CID	combat intelligence division
CINC	commander in chief
CINCCENT	commander in chief, Central Command
CINCLANT	commander in chief, Atlantic Command
CINCSOUTH	commander in chief, US Southern Command
COMAFFOR	commander, Air Force Forces
COMM	communications
COMPT	comptroller
COMPW	composite wing
COMSOUTHAF	commander, US Southern Air Force
COMUSCENTAF	commander, US Air Forces Central Command
CONUS	continental United States
COS	combat operations staff
CPX	command post exercise
CT	coordinating technician
CTAPS	Contingency TACS Advanced Planning System
CTSC	combat targeting support cell
DASD	direct access storage device
DCO	director of combat operations
DCP	director of combat plans
DCS	deputy chief of staff
DDO	defensive duty officer
DO	director of operations
	duty officer
DSN	defense switched network
EAC	echelons above corps
ECDO	electronic combat duty officer
ELINT	electronic intelligence
ENSCD	enemy situation correlation division
EOB	electronic order of battle
FAF	French Air Force
FDO	fighter duty officer
FM	field manual
FMC	fighter mission coordinator
GOB	ground order of battle
HF	high frequency

IAF	Italian Air Force
ICO	interface control officer
IITS	Intra-theater Imagery Transmission System
JCS	Joint Chiefs of Staff
JFACC	joint force air component commander
JFC	joint force commander
JOC	joint operations center
JRCC	joint rescue coordination center
J-STARS	joint surveillance target attack radar system
LA	Latin America
LANTIRN	low altitude night targeting infrared navigation
LCC	land component commander
LO	liaison officer
LRC	logistics readiness center
MAC	Military Airlift Command
MACLO	Military Airlift Command liaison officer
MARCENT	Marine Central Command
MARFOR	Marine forces
MARLO	Marine Corps liaison officer
MOB	military order of battle
MPC	message processing center
MTACC	modular tactical air control center
NAF	numbered air force
NALE	naval and amphibious liaison element
NAVFOR	naval forces
NBC	nuclear, biological, and chemical
NCC	naval component commander
NOB	naval order of battle
OI	operating instruction
OJCS	Office of the Joint Chiefs of Staff
QA	quality assurance
RAF	Royal Air Force
RDO	reconnaissance duty officer
RECCE	reconnaissance
ROE	rules of engagement
RSAF	Royal Saudi Air Force
SAC	Strategic Air Command
SACLO	Strategic Air Command liaison officer
SADO	senior air defense duty officer
SAR	search and rescue

SATCOM	satellite communications
SMDO	special mission duty officer
SODO	senior operations duty officer
SODT	senior operations duty technician
SOUTHAF	US Air Forces, Southern Command
SOUTHCOM	US Southern Command
SPINS	special instructions
ST	status technician
STAN/EVAL	standardization/evaluation
TAC	Tactical Air Command
TACM	Tactical Air Command manual
TACP	Tactical Air Command pamphlet
TACR	Tactical Air Command regulation
TACS	theater air control system
TAF HQ	Tactical Air Force headquarters
TDC	track data coordinator
TEP	tactical ELINT processor
TIBS/CS	theater intelligence battle situation/Constant Source
TIS	tactical intelligence squadron
TMDC	tactical mission data coordinator
TRADOC	Training and Doctrine Command (Army)
UHF	ultrahigh frequency
USAFR	US Air Force Reserve
USMC LO	US Marine Corps liaison officer
VHF	very high frequency
VS	Volant Solo
WOC	wing operations center
WX	weather